# The Iron Age

## A Review of the Hardware and Metal Trades.

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### Bessemer Blowing Engine.

We illustrate herewith a blowing engine constructed by Messrs. Mackintosh, Hemphill & Co., of Pittsburgh, Pa., for the Edgar Thompson Steel Works. Two of the engines, working independently, supply the blast for a five ton Bessemer plant.

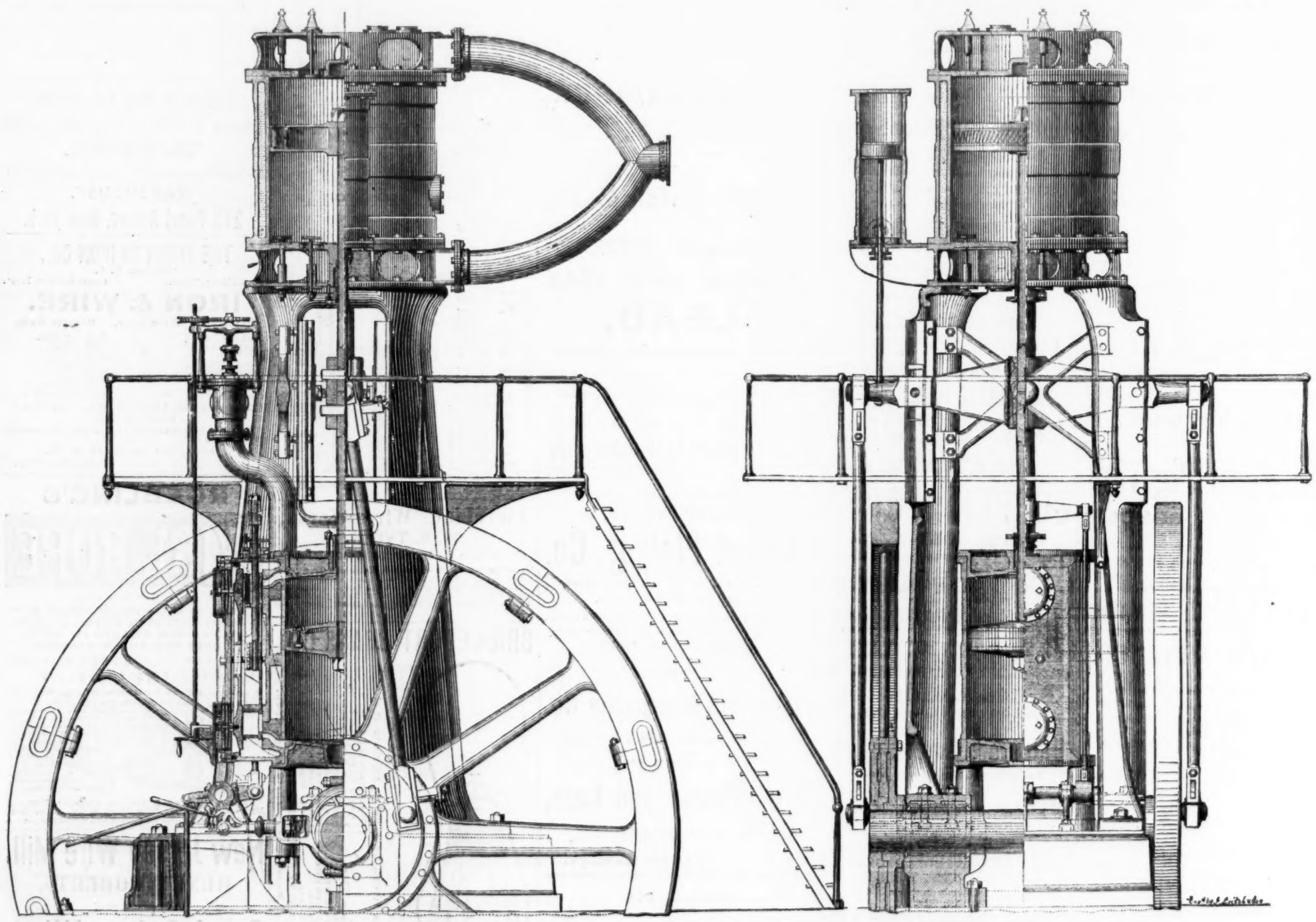
The engine is, as will be seen, of the vertical type, with the blowing cylinder mounted on the top of the framing and the steam cylinder below, the crosshead working between the two cylinders, and there being two connecting rods coupled to crank pins in the fly-wheel bosses. The steam cylinder is 42 inches and the blowing cylinder 54 inches in diameter, the stroke being 4 feet. The steam cylinder is fitted with Hemphill's balanced slide valve.

The blowing cylinder is provided with a water jacket, the cylinder body and the jacket being cast in one. Water is circulated through the jacket to absorb the heat developed by the compression of the air. The blowing piston is packed by a cast iron ring having recesses filled with a soft alloy of lead and antimony, the recesses being placed diagonally.

The valves of the blowing cylinder are round plates of vulcanized India rubber, each backed by a brass flanged stem. The flange just mentioned supports the India rubber, and the valves opening downward are closed against their seats by spiral springs placed around the valve stems. This arrangement of valves enables the clearance spaces at the end of the blowing cylinder to be made very small, as there are no projecting parts to take up space.

The piston rods are of homogeneous steel, that of the steam cylinder being 5¼ inches and that of the blowing cylinder 5¾ inches in diameter. The fly-wheel shaft is of cast iron (cold blast charcoal iron), and is 16 inches in diameter. These cast iron shafts are largely used in this country and with good results. A feature in the engine is the manner in which the reciprocating parts are balanced, this being done by connecting the crosshead to a piston working in a 16 inch cylinder. The lower end of this cylinder is supplied with steam direct from the boiler, this steam acting on the underside of the balance piston and flowing into and out of the cylinder as the piston rises and falls. Of course no valve is required. The use of a steam cylinder in this way enables the weight of the reciprocating parts to be balanced very conveniently, and the plan appears worthy of adoption. As applied in the engine under notice, however, the attachment is somewhat one-sided, and might, in this respect, be improved.

The weight of the engine we illustrate is 61 tons, exclusive of the fly-wheels, the latter being 20 feet in diameter and weighing 22 tons each. The total weight of the engine is thus 105 tons. The whole design is very neat and substantial, and the engines, we are informed, do their work most satisfactorily.



BLOWING ENGINE FOR THE EDGAR THOMPSON STEEL WORKS—BUILT BY MACKINTOSH, HEMPHILL & CO., PITTSBURGH.

### The Water Supply of Philadelphia.

The rapid growth of the city of Philadelphia, and the necessity it has for an abundant and cheap water supply, makes the subject one of the greatest interest and importance. The *Ledger* has, in a recent issue, a very interesting editorial on this subject. It says: "It is not too much to say that no city in the world, of the rank and importance of Philadelphia, situated, as Philadelphia is, on a broad and deep arm of the sea, is as well supplied by nature with the means for a copious supply of good, wholesome water. And yet, with such unrivalled facilities for such a situation, the city has been for years past more or less disturbed by agitations both as to the quantity and quality of the water supply. This has been the theme of councils and council committees, of "engineers" and contractors, and of discussions through the newspaper press. One might be led to think that it is beset by enormous difficulties, and yet no one who undertakes to examine it dispassionately, apart from "jobs" and what is supposed to be the interest of small sections and localities, can find any great difficulty about it, except that the subject is not capably managed, and that the city did not do in season what ought to have been done long ago.

The three points of importance are, an abundant supply, good quality in the water, and the most economical system of pumping machinery and other appliances. For present purposes, and for the probable exigencies of the next thirty or forty years, the Schuylkill puts within the reach of Philadelphia the available means for all three of these important essentials. First, as to the quantity of the supply, it should hardly need argument to show that a stream that flows over the dam at Fairmount an average of more than fifteen hundred millions of gallons every twenty-four hours, is quite certain to be able to furnish a copious supply of water to a city that needs an average of forty millions of gallons a day now, and is not likely to need an average of more than a hundred millions a day within the present century. Certainly there is enough here for the use of the inhabitants for generations to come for the ordinary household, manufacturing and other purposes for which our water supply is now used. So much for that branch of the question. But the overflow of the Schuylkill is valuable for other uses than a supply for the purposes named. It is the most economical power for driving the pumping machinery to lift the water into the high reservoirs from which it is distributed for use throughout the city. Is there a sufficient average flow of water down the Schuylkill abreast of the city to drive pumping machinery that will give us an average of forty, fifty, sixty, eighty or a hundred millions of gallons a day for distribution daily throughout the city whenever so much shall be needed? This is of course a question for those acquainted with the rain fall over the area drained by the Schuylkill, the amount lost by evaporation and escape out of the area drained by the river, and for engineers capable of calculating the amount of pumping energy that remains in what reaches the several dams in the neighborhood of the city at Flat Rock and Fairmount. Engineers and other authorities differ somewhat in their answers to this question, so far as it relates to the wants of the city a generation or two in the future; but it may be said that the best authorities are of the opinion that there is an abundance of water for all the purposes mentioned for the present and for the near future, provided the whole of the flow and power of the Schuylkill shall be utilized, and not allowed to run to waste as it does now, and provided that the water wheels to do the pumping are properly placed. Thus we have reason to believe that we have in the Schuylkill the means of an abundant supply, and a cheaply furnished supply, for so long a time to come, that we need be in no trouble about the next third of a century at least.

Then as to the quality, Dr. Cresson's recent report of his examinations show that nearly all of the injurious pollution found in the Schuylkill water at some seasons of the year comes from sources quite close at home, all of which are under the control of the city, and every one of them preventible or avoidable. There can be no reasonable doubt of this. Here the third of the three essentials is made quite available.

What, then, should be the policy of the city authorities? Clearly to seek for and adopt the best system for utilizing the whole flow and power of the Schuylkill, so as to secure an abundant supply for all seasons, both for consumption by the inhabitants of the city, and for the most economical power to drive the pumping machinery. Water-power is cheap, steam-power is costly; in the proportion of at least ten to one. The further policy is to adopt, without delay, the most effective means for preventing foul drainage from emptying into the Schuylkill above the dam, and within the city limits. The man who is put upon his proof to show that such is not the right policy—whether such man be "engineer" or layman—will have a rather difficult task.

What then should be done now? Provide, as soon as it can be done, for what is indispensable next year, and do it in such a way as will make what is done now useful in any approved system that may be adopted hereafter, and in the meantime appoint a competent commission to ascertain whether the flow of the Schuylkill can be utilized to the extent required for an abundant and cheap supply for the present and next coming generation.

**How an Engineman was Rescued.**—This is what is told of an engineman's narrow escape from freezing to death on the Burlington, Cedar Rapids & Minnesota Road last winter: "A passenger train got snowed in so that it could neither back out nor go ahead, and the engineer, the old reliable Simpson, finding that he was going to have a dead engine on his hands, got down underneath to open the blow-off valve, which he could not operate from the cab. While there his clothes froze to the track, and it took the entire force of trainmen, from the conductor down, to get him out. The stoker wanted to build a fire around him, but he objected so strenuously to such a waste of the little fuel which was left that they finally tied a rope around his leg, and then attaching it to the brake rod, and telling a hundred and ninety pound brakemen to throw his weight on that wheel, they brought him out with such an artistic flourish that he got mad about it and passed the remainder of the day in chasing the brakeman around the prairie with an 18 inch monkey wrench."

The Atlantic and Pacific Telegraph Company are placing the automatic telegraph instrument in their offices, by which messages are sent by the turn of a crank, they being first committed to ribbons of paper which are perforated to represent words, and this paper on reels, being given to the dispatching instrument, passes through and communicates its business to the wire, and is received at any other office on a like instrument, printed on a paper ribbond. The advantage is in being able to prepare all business for the wire correctly before it is sent, and as much of it ahead of the sender as may seem necessary. The instruments can also be operated when the electric conditions are not favorable for the operation of the ordinary writing instruments.

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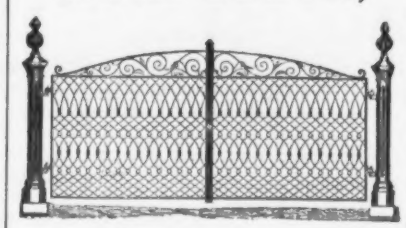

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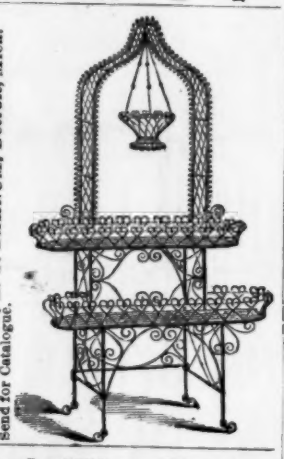

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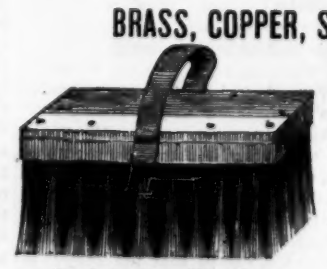

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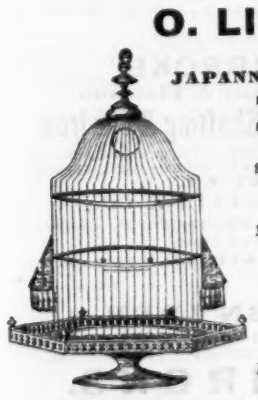

Dates of our Patents:
September 3d, 1861.
October 4th, 1870.
August 29th, 1871.
November 7th, 1871.
January 2d, 1872.
March 12th, 1872.
February 4th, 1873.
November 17th, 1874.
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Re-issue, October 29th, 1872.
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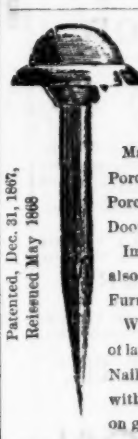

Patented, Dec. 31, 1867, Reissued May 1868

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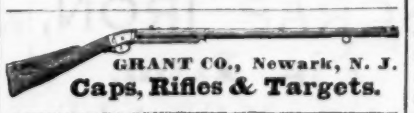

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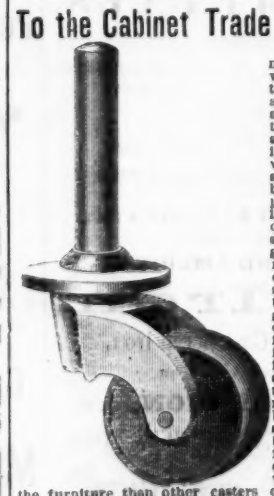

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## Steel Bronze.

In a recent number we gave our readers some account of steel bronze and the properties which it displayed. *Engineering*, in speaking of this substance, and the experiments made upon it, says that the idea of compressing steel when in a state of fusion, conceived and carried out by Sir Joseph Whitworth, led to many experiments in the same direction; and about two years ago the Archduke Guillaume, Director General of the Austrian artillery, brought from Russia a specimen of bronze which had been compressed when in a fluid state, and which was found greatly superior to the bronze in use in Austria. About the same time, M. Lavessiere, of Paris, exhibited at Vienna bronze and bronze guns of the same quality. These circumstances led Colonel Uchatius, director of the arsenal at Vienna, whose name is attached to a peculiarly fine and tenacious kind of steel made in Sweden, to take up the subject in an exhaustive manner, and the results are now before us.

Colonel Uchatius found that, with an alloy of 90 per cent. of copper and 10 per cent. of tin, and a pressure of about 80 tons, he could produce bronze equal in hardness to the Russian specimen. A cast iron mold 0·26 meter in diameter and 0·70 meter high, was thus filled with liquid bronze, which solidified in five minutes, and contracted so powerfully in the direction of the axis that the only part of the ingot which could be considered as sound was that which filled the lower part of the mold to the hight of about 0·18 meter. In breaking this cylindrical mass, the outer portion was found to be of a crystalline texture, of golden color, gradually changing to a dense gray mass in the center. But bronze thus cast was still wanting in the qualities required for guns. The metal was very tenacious, and the cannon rarely burst, but the elasticity of such metal is not much greater than that of ordinary bronze, and it is not hard enough to rifle the copper bands of projectiles. Colonel Uchatius then tried the experiment of cold rolling bronze cast in an ingot, and succeeded in increasing its power of resistance, elasticity and hardness. He found that the metal could be rolled out to double its original length without the slightest trace of cracking, and that when elongated only 20 per cent. of the bronze acquired the hardness, the elasticity and the resistance of steel. Experiments also proved that the elasticity of all tenacious substances increased rapidly when they were subjected to a force which exceeded the limit of the elasticity, a fact which Colonel Uchatius considers of considerable importance in metallurgical industry. Thus, bronze cast in an open cylindrical mold attains the limit of its elasticity under a force of 400 kilogrammes, which corresponds with an elongation of the original length by about ·0004 parts, whereas, if it be subjected to a tensile force which lengthens it permanently ·004, the limit of its elasticity is raised to 1600 kilogrammes, with an elastic increase of ·00192 of the primitive length. Colonel Uchatius thus sets down the conditions which are to be realized in the manufacture of bronze cannon: The effect of the explosion of the powder in the breech of the arm should be counteracted by a mechanical compression of the metal of the interior to a degree greater than that caused by the explosion of the charge. The metal employed for the interior of cannon should, therefore, be submitted to a treatment analogous to rolling, which, at the same time, will give the metal the desired degree of hardness. The questions remain: Which is the best kind of bronze? and, can a metal be obtained which is perfectly homogeneous in quality from the circumference to the center? To settle this point seven alloys were tried:

| No. | Tin. Per cent. | Copper. Per cent. | Zinc. |
|---|---|---|---|
| 1 | 12 | 88 | Nil. |
| 2 | 10 | 90 | " |
| 3 | 8 | 92 | " |
| 4 | 6 | 94 | " |
| 5 | 10 | 88 | 2 per cent. |
| 6 | 10 | 89 | 1 " |
| 7 | 8¾ | 91 | ¼ " |

The last is the alloy used by M. Lavessiere. Two small bars were cut out of each ingot, and were rolled until they had acquired the hardness of steel. No. 1, however, would not roll. Nos. 2, 3 and 4 rolled well; the zinc in the three last examples was found of no appreciable utility. Nos. 2, 3 and 4 were subjected to strains of 5066, 5200 and 5460 kilogrammes respectively. The limits of their elasticity were found to range from 1700 to 1300 kilogrammes, and the permanent elongation to arrive at the desired hardness was in the case of No. 2, 20; in that of No. 3, 30, and of No. 4, 50 per cent.

The only mode apparent for producing homogeneousness throughout the ingot was to cool at once the inside and the out, by the adoption of a double mold. A bronze tube was therefore introduced into the mold, and a stream of water kept up through the tube during the running. The whole mass was found to be crystalline, but there were flaws in concentric circles around the core. Air was tried instead of water, but in that case the bronze tube melted; solid cores in bronze, copper and cast iron were tried, and a solid forged copper core 0·05 meter in diameter gave satisfactory results. The bronze cylinders thus obtained were 0·62 meter in diameter, and 0·30 meter long; they were turned down to 0·18 meter outside, and the interior bored out to 0·08 meter. The cylinder was then opened by means of conical steel drifts and a hydraulic press; six drifts were employed, the first being 0·002 meter larger in diameter than the interior of the bronze cylinder, and the last only 0·0005 meter larger than the fifth, so that the cylinder was enlarged 2 per cent.; the interior was then excessively hard and polished, and was ready for rifling. A peculiar advantage claimed for this mode of compression is that if the metal were not sound the fault would immediately appear; and it is remarked that after the last drift has been withdrawn the bronze cylinder contracts again to the extent of 4-1000, which proves that the different parts had undergone compression equal, according to calculation, to a central radial pressure of 2400 atmospheres. The alloy No. 3, containing 8 per cent. of tin, was found, after many trials, to be the best, and the most economical. The qualities of these bronze guns are summed up in the following terms: The cannon produced in the manner described, are declared to possess all the hardness, homogeneousness and resistance of steel tubes. The quality of the bronze varies from the exterior to the interior of the piece in proportion to the force to be resisted; the hardness, elasticity, and solidity diminishing from the interior to the outside, and all these qualities are more developed than in steel guns. The elasticity of which the direction is opposed to that of the explosive force of the charge, acts in a continuous manner from the exterior surface of these bronze guns to the interior; but the neutral axis, where the interior and exterior forces are in equilibrium, is very near to the inner surface. For such a gun to burst, the elasticity of the whole mass must overcome simultaneously, and the great tenacity of the external part, which will bear an extension of 70 per cent. without rupture, is opposed to the action of the explosive force. In the guns formed with rings shrunk on, the neutral axis lies between the central tube and the strengthening rings, the consequence of which is that the latter have to support the whole force of the explosion. With respect to the wear of the interior surface of the chambers of the guns, Colonel Uchatius says that chemical action plays no part in it, and that it is due merely to the violent projection of the grains of powder which act like sand upon the metal, and that the effect is always most apparent where the metal is the hardest, which explains the necessity of placing a copper tube in the touch hole. The compressed bronze is not more liable to wear than steel. This bronze is much less affected by atmospheric agency than steel. The cost of bronze guns is much less than that of steel, if the value of the old metal be taken into the account.

Finally, the new bronze is declared to surpass all materials yet applied to the production of guns, and if the trials which are about to be made with a large number of field pieces should corroborate the experiments made on a small scale, the production of steel guns will be abandoned. One of these new bronze guns has borne several hundred discharges, with the ordinary charge, successively, without the slightest deformity or injury being apparent in any part of the piece.

## Iron Bridge Cylinders.

The following hints on this subject are taken from Mr. John Newman's useful pamphlet on "Iron Cylinder Bridge Piers:" As the strength of cast iron depends upon its rigidity, it is necessary to stiffen the cylinder rings by lugs or brackets, and vertical and horizontal flanges, which also form the joint flanges. The joints should be made slightly stronger than the solid parts of the work, as they are subject to special defects, such as unequal bearings, &c. The vertical and horizontal flanges of the cylinder should be well and firmly bolted together, as the lateral strength of the cylinder is thereby secured. It may be as well in cylinders of small diameter to lessen the length of each ring and make them in one piece, thus obviating the necessity of any vertical joint flanges, and with the increased facilities and improved machinery now in use, many iron masters will do this without any extra charge. In tropical climates, where the atmosphere affects the metal to a greater extent than in Europe, ample allowance in the thickness of the cylinder should be made. There is greater liability to imperfections in the castings if the rings forming the cylinder are cast horizontally instead of vertically. In increasing the thickness of the rings of the cylinder, the same unit of strength per square inch for the increased area does not hold, for beyond a certain thickness the value per square inch decreases very considerably. The author would never use a less thickness of cast iron in the rings of the cylinder than 1 inch, or a greater thickness than 2½ inches, and this latter only as an exceptional case and for the bottom ring, which, to facilitate the sinking, is generally brought to a taper. Castings are generally made of greater thickness in practice than the requirements of theory show as necessary. Cast iron is more liable to be broken by collision with floating substances than wrought iron. It is usual when a bolt passes through a piece of cast iron to increase the thickness of the metal at that point to a little beyond where the head or the nut of the bolt extends. A bad joint will often not be discovered on testing a structure, but only after it has been subject to continuous strain and vibration; thus the importance of good and sound joints is evident. It is advisable to make the bottom ring of the cylinder thicker than the other rings, on account of the greater cross strain, &c., it has to bear. Much of the strength of a casting depends on the design. There should be as few abrupt bends, sharp angles, and sudden variations of thickness as possible, in order to obtain equal and uniform cooling, and accord in the order and direction of crystallization, as it has been found from experience that wherever the order of crystallization is disturbed there will be found weakness. Increased thickness should not be considered as an equivalent to inferior iron, for in no material can it be said with greater truth that it is absolutely necessary to have quality as well as quantity.

A new process for ornamenting metal surfaces has been recently invented in this country. It consists in plating, electro-plating, or otherwise covering a plate, bar, or ingot of soft metal, and then rolling out or pressing the ingot into a sheet; whereby the coating is broken into irregular forms, and a marbelized appearance produced on the surface of the sheet.

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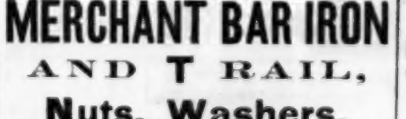
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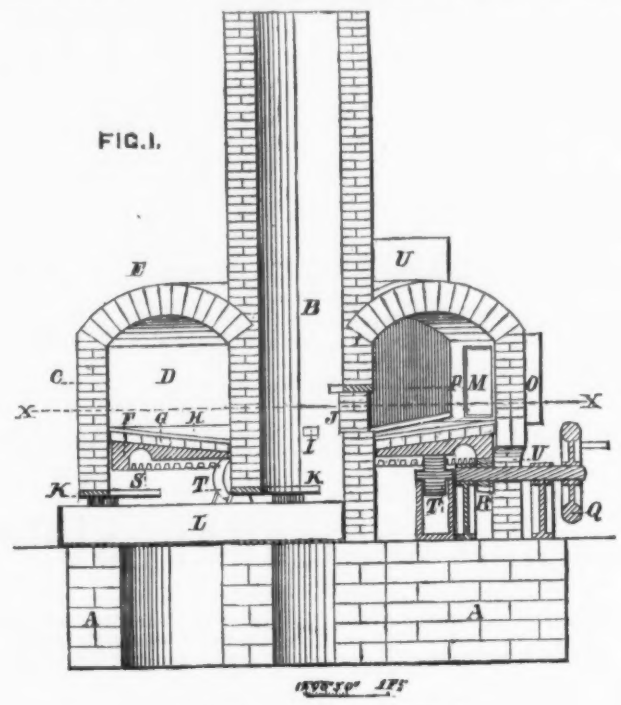
## New Patents.

We take from the records of the Patent Office at Washington the following specifications of certain patents lately issued, which will be found interesting:

IMPROVEMENT IN METALLURGIC HEATING FURNACES.

Specification forming part of Letters Patent No. 159,039, dated January 26, 1875, issued to Henry Ragot, of Pittsburgh, Pa.:

This invention relates to an improvement in heating furnaces used in the manufacture of iron and steel, and consists of a circular furnace provided with a flue, or stack, in its center, and its bottom mounted upon rollers, and so arranged that it can be rotated, its heating chamber furnished with a sand box and a charging door, and a door for withdrawing the charges, the charging and withdrawing compartments of the heating chamber being separated through the medium of a partition wall, the said heating chamber being heated by means of a suitable gas or heat generator of any of the known forms.




IMPROVED METALLURGIC FURNACE.

In the accompanying drawings Figure 1 is a vertical section of the furnace at line x of Fig. 2. Fig. 2 is a horizontal section of the furnace at line x' of Fig. 1.

In the accompanying drawings A represents the foundation walls of the furnace. B represents the stack. C represents the outer side wall of the furnace, and E the crown of the same. The bottom of the heating chamber, D, consists of a disk F, provided with cogs S, which gear into teeth of the wheel R, of the shaft V, on the outer end of which is a hand wheel, Q, for rotating it. The disk F is mounted on rollers T, so that it can be easily rotated. The upper side of the disk F is covered with brick G, on which is formed the bottom, H, which is formed in the usual way and of the ordinary material. The heating chamber, D, is provided with an opening M, and door O, for charging the chamber with the "piles" of iron or steel. The heating chamber is also provided with an opening N, and door O, for "drawing" out the heated piles. Between the openings M and N of the heating-chamber D is a partition, P, dividing the charging-compartment of the heating-chamber from the drawing-compartment. On the right hand side of the door O is an opening, W, for the inlet of heat or gas from the heat or gas generator, which may be of any known construction. The stack B is furnished with an opening, J, for allowing the waste heat to escape into it, and also with an opening, I, which is used for drawing off the slag into the slag-box, which can be withdrawn from the chamber K, and emptied at the will of the operator. The piles are placed in the furnace through the opening M, consecutively, the bottom H being rotated in the direction indicated by the arrows shown in Fig. 2. When the furnace is fully charged, and the first charge placed in it has been sufficiently heated, it is withdrawn, and the bottom H is then rotated until the space occupied by the withdrawn charge is opposite the opening M, when a fresh charge is put in the furnace to take the place of the charge which has been withdrawn, and in this manner is the withdrawing and charging continued at the will of the operator. The crown of the furnace is furnished with a sand-box, U, which communicates with the interior of the heating-chamber, the said box being provided with a valve for regulating the flow of the sand into the heating-chamber, the sand being used for the purpose of forming bottom, and also for a flux in the heating process.

The advantages of this improvement consist in economy of room and fuel, uniformity of work in the heating process, and saving of time and labor.

*Claim*—1. A circular heating-furnace, provided with a partition, charging and drawing door and central flue, around which rotates the bottom of said furnace, the travel of said bottom being from the charging-door toward the inlet or flame and drawing-door, the heating-chamber of the furnace communicating with a fire-chamber or gas-generator and with the central stack.

2. A circular heating-furnace, provided with a partition-wall, having the charging-door arranged on one side of said partition and the drawing-door and inlet of the heat or flame on the other side of said partition.

3. A circular heating-furnace, provided with a central flue and rotating bottom, with the opening communicating with said central flue, arranged opposite, or nearly opposite the charging-door.

4. A circular heating-furnace with a rotating bottom, provided with a sand distributing chamber.

5. A circular heating-furnace with a central flue and revolving bottom, having a slag-discharging opening communicating with said flue.

IMPROVEMENT IN CONVERTING IRON INTO STEEL.

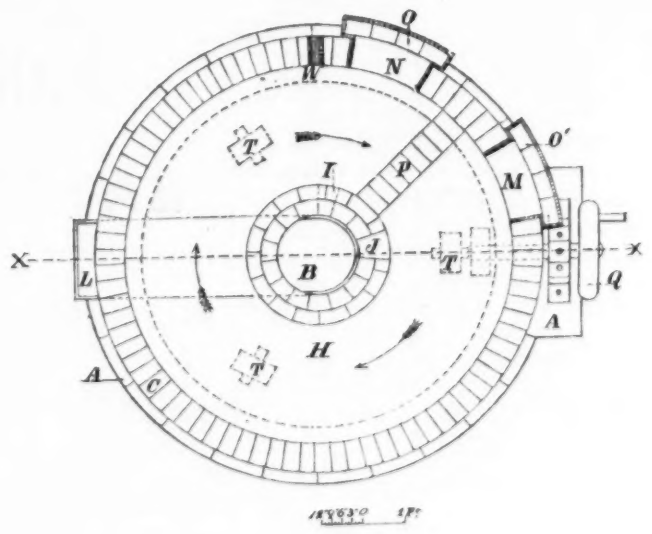
Specification forming part of Letters Patent No. 159,402, dated February 2, 1875, issued to Mark S. Foote and Greenbury R. Henry, of Burlington, Iowa.

This invention relates to a new improvement in the making and working of steel and iron, and more particularly to a new process of renewing old iron or combining cast and wrought iron, so as to produce steel, and of case-hardening or converting into steel any cast or wrought iron or cast steel by immersion in a bath of melted metal, produced by melting cast iron with the flux produced by the process described in Letters Patent No. 148,556, to Mark S. Foote, dated March 17, 1874.

The process of renewing old iron is to melt, in a cupola or other furnace, any old stove plate, grate bar, &c., with about 20 per cent. of the flux above mentioned, said flux made by heat alone, and composed of iron ore, coke, limestone and fire clay or broken crockery. The product, when cool, will be a clear cast iron, capable of being used and worked as any other iron. The process of converting scrap steel into material which can be used is simply to melt it with the flux added in the proportion of one to ten. The product of this flux, melted with cast iron in the proportion of about two to ten, is a hard white metal, which, when melted, forms a solution in which, if wrought iron or cast iron be immersed for variable periods of time, from ten minutes to two hours, according to the thickness of the iron, it will be covered with a hard coating, which extends into the iron, and permeates small pieces of it—in fact, converts the outer surface into steel, so that chisels for cutting wood or iron may be made with a fine and durable edge; and axes, hatchets, and other edged tools can be made of iron, and, by immersion in this bath, are converted into tools with steel edges; or the tread of a railroad bar can thus be converted into steel, while the flange remains iron; or the rail can be made by immersing the upper portion of the fagot, that is afterward drawn out into the rail before making the rail, and thus making the tread of steel and the body of iron; or, by immersing the whole of the fagot in the solution before rolling it out into a bar, the whole will be of steel. Scraps of steel melted with this flux produce a clear steel of uniform texture.

*Claim.*—The solution or bath, composed of the above named flux, made by heat alone, and composed of iron ore, coke, limestone, and fire clay or broken crockery, wrought iron, cast iron and scrap steel, in the proportions substantially as described, and for the purposes specified.

FIG. 2.




## How Iron is Made in England.

A correspondent of the New York *Herald*, writing from Liverpool, occupies three columns of that journal with an essay on naval architecture, from which we quote the following extraordinary account of the way they make iron in England. We suspect it is the same writer who corresponded for the *Times* from Pennsylvania about two years ago, for we doubt if any other person could have described the English method so graphically and accurately:

"When passing along the coast of England in an iron steamer, but few persons would think that but a short time ago the hull they were floating on was a mass of hard stone that composed a part of the land they were looking at. Perhaps six months ago men were quarrying it out of the side of a hill, from there dragged higher up and put into a blast furnace or white hot fire, where it is made to crack, pop and burst into pieces, making reports like hundreds of guns, and as it does so sinks lower and lower into the furnace, until it gets quite to the bottom of it. When it comes out into daylight again and before it is cold it is put into iron barrows and hoisted up still higher than before, and when at the top is once more turned into another flaming furnace, mixed up with other stuff, when it gradually sinks lower down, and, as it sinks, it becomes hotter and hotter until it is as white as snow, then it melts, and as it does so it runs into a vessel at the bottom, and there it is kept in that state until there is enough of it collected, then the vessel is tapped and the molten iron is allowed to run out on to a sandy ground, where gutters have been made for it to run; it passes along them until it arrives where a number of holes have been made for it to fill, it fills them, stops running, gets cold and is then what is known as pig iron.

"When these pigs of iron are required they are taken away to another furnace and are thrown into it, and this time they are made white hot, so that a number of the pigs of iron get into one mass and as white as a mass of snow. In that state it is pulled out of the furnace and placed on a large shovel, the pan part of which is on wheels. The mass is then wheeled to an enormous steam hammer and is placed under it. With a terrific smash it falls on to the white lump, sending the sparks flying far and wide as if it were going to blind everybody and set everything on fire around it. Then the heavy hammer is lifted again, and, when high enough, is allowed to fall down again with another tremendous crushing blow, which sends the still white mass into a flat, ovel, rough edged lump of solid iron.

"At this stage it is again put on the shovel with wheels, and is put under another steam hammer, and there it is hammered edgeways and hammered until it becomes a square lump and flattened; this being done it is then taken to a weighing machine, and its weight being determined the square lump of still white hot iron is taken to where there are placed two enormous iron rollers. One side of the square piece is then placed against these two rollers, which are revolving quickly around, when the upper roller takes a grip of the edge of the iron above, the lower roller takes hold of the lower edge and with their united grips they force the heavy lump between them, and between them the iron must go, and as it passes through it flattens considerably the first time; then it is picked up on the other side and passed through back again; and again and again it has to go through, until it is thin enough to be a sheet of iron to form a piece of a ship."

**History of Water Pumps.**—Prof. Ruhlmann has published a long article in a Hannover journal on the invention and history of water pumps. He concludes that the pump of to-day is a Grecian invention, and was probably made during the reign of the Ptolemies, Philadelphos and Euergetes, 283 to 221 B. C. The name, which is very similar in all languages, is derived from the Greek word *pempo*, to send or throw. The most ancient description that we have of a water pump is by Hero, of Alexandre. There is no authentic account of the general use of the pump in Germany previous to the beginning of the sixteenth century. About the same time the endless chain and bucket works for raising water from mines began to be replaced by pumps. In the seventeenth century rotating pumps, like the Pappenheim engine with two pistons and the Prince Rupert's pump with one piston, were known in Germany. The pumps with plunger pistons were invented in 1674 by an Englishman named Morland, and the double acting pump by a French academician, de s Hire

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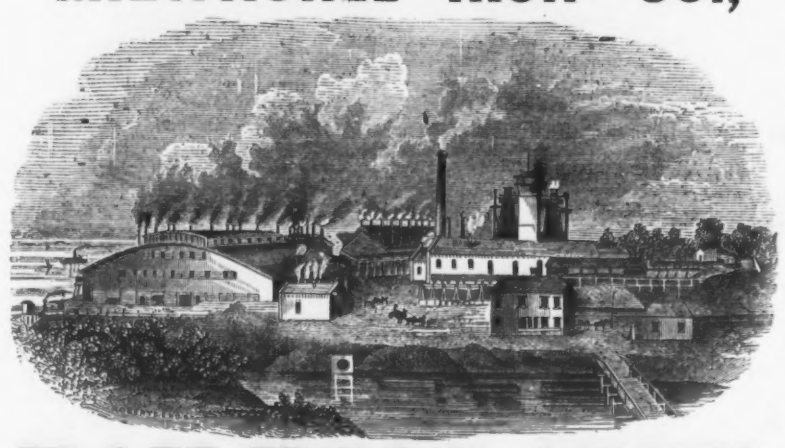

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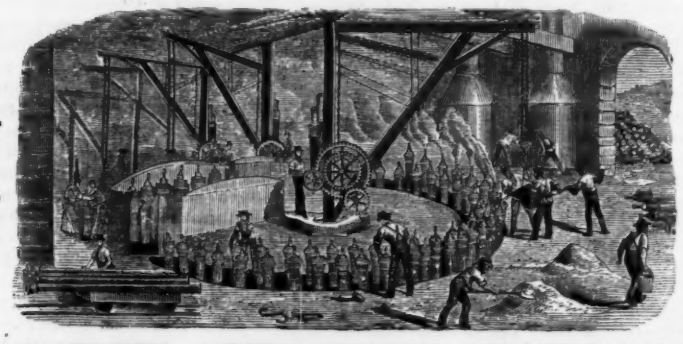

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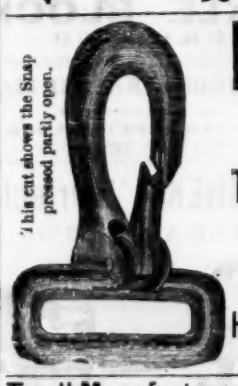


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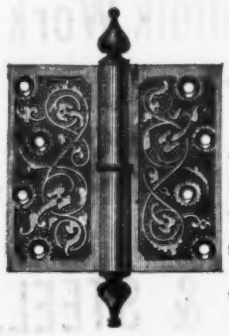

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## The Economic Use of Blast Furnace Slag.*

BY PERRY F. NURSEY.

There was a time in the history of the arts and manufactures—and that time is well within the memory of the youngest member of the profession—when every department had what were termed its waste products. In some instances this waste was an unconscious one, unrealized by those whom it most affected. In others, however, manufacturers possessed a knowledge of their loss, but strove in vain to lessen or prevent it. Especially was this the case in metallurgical science, where, almost from the first, the value and usefulness of many waste products were fully recognized, and where continued efforts were made to utilize them. It is but a few years since that the gases of the blast furnace were truly yet regretfully looked upon as waste, but for which at length inventive talent found a profitable application. And so in other departments of manufacture, the rapid development of mechanical and chemical science has led to the successful application of waste substances in directions previously but little hoped for, if not wholly unthought of. And thus to-day finds some of the most simple of our industrial processes, each the parent of a variety of others, all more or less beautiful in their conception and happy in their practical results; all tending to promote and sustain commerce, and to enrich the nations of the world. Witness the ultimate results of the destructive distillation of coal, or the more recent perfect utilization of the hitherto valueless waste produced in the manufacture of spun silk. The term "waste products" is now all but expunged from the vocabulary of applied science, and that of "bye products," so pregnant with meaning, has by common consent become its valued substitute. Manufacturers, instead of seeking how best to rid themselves of what they in their ignorance deemed a nuisance and an incumbrance, are now for the most part busied in devising methods for its careful retention, with the view to its ultimate conversion into substantial profit.

One of the most expensive, cumbersome, and until recent years, useless products in the metallurgy of iron is the slag of the blast furnace. The yield of this substance from the Cleveland blast furnaces is about half as much again as that of the iron produced, while its bulk is more than three times greater than that of the metal. In the hematite districts the proportions of slag and iron are about equal. This mass of material absorbs and radiates an enormous amount of waste heat, which is so much loss of power. Hence attempts have been made to utilize the heat thus wasted, but without success. It is a heavy incumbrance, inasmuch as large tracts of land have to be purchased whereon to deposit it, the investment being of course wholly unremunerative. One iron manufacturing firm at least, within the author's knowledge, is exempt from this tax upon its capital, and that is the Hudson Iron Works in the United States, where the slag is used to fill in shallow bays. Thus, instead of having to purchase land for the deposit of the slag, the latter is actually utilized for the formation of land. Again, it is a source of great inconvenience at the blast furnace, accumulating there as it does in a hot, viscous mass, difficult to handle, and requiring special tools for removal. In fact, the labor spent upon this unproductive substance often equals the whole productive labor of the blast furnace. No wonder, then, that from the first persistent efforts have been made either to utilize it or to get rid of it altogether. The variety of schemes proposed for either or both of these purposes has only been equalled by the ingenuity displayed in devising them.

The refractory character of blast furnace slag pointed it out in very early times as a suitable material for road making, and it was thus first used, being broken up by hand for the purpose. But the demand in this respect is comparatively limited, and falls so infinitely short of the supply, that our slag heaps have gone on steadily increasing in bulk until at old established works they have attained enormous proportions. In some Continental States, where stone is scarce, slag plays a prominent part in road making, where it can be procured in large quantities. In Silesia, and other similarly situated countries, careful attention has been devoted to the treatment of slag, in order to render it as suitable as possible for road making, being the only available material for that purpose. The great brittleness of slag is one of its objectionable features, so that in the first instance attempts were made to devitrify it. This implies a supply of cheap fuel, otherwise the process would prove too costly. As cheap fuel is scarce, devitrification is in some places successfully effected by allowing the slag to accumulate around the blast furnace, and to cool slowly under considerable pressure. This method is adopted at Tarnowitz and other districts in Silesia, where the slag accumulates to a thickness of 18 inches before removal. The process is, however, imperfect, only the lower half becoming devitrified; but it nevertheless furnishes a good road making material.

Another direction in which attempts have been made to utilize slag is to adapt it for constructive purposes. In the Cleveland and some other districts the slag is run into molds and afterward used for foundations, embankments, reclaiming land from the sea, and for similar purposes. In the Black Country the author has seen walls, and even houses, built up of molded slag blocks, and they have in some instances presented a very pleasing appearance, owing to the variegated nature of the slag, but in all these cases there is a limit to the application, whilst there at present continues to be no limit to the supply of the material. Attempts have been made to utilize slag for ornamental purposes, by running it into molds and afterward annealing it; but the latter process was found to be too costly, and this anticipated source of relief proved to be but one of disappointment.

In some Continental countries building stone is very scarce, and as slag appeared to contain the elements of a good building material, it was submitted to seemingly endless experiment, attended by apparently endless failure. In time, however, success came, and the result was the production of a very useful material for certain kinds of construction. The process of manufacture as carried out at Konigshutte, in Silesia, consists in running the slag from the furnace into a hemispherical basin on wheels. The bottom of this basin is covered with sand or fine coke dust to the depth of about 1¼ inch, and the wagon is drawn to the point where the bricks are to be made. The slag and sand are mixed together with a curved iron tool until most of the gases have escaped and the mass is about the consistency of dough. It is then drawn with the same tool into a mold with a hinged cover, and punctured several times to let out the gas. The cover, which fits into the mold, is then turned down, and the slag becomes compressed. By the time three or four molds have been filled, the first slag brick is sufficiently solid to be removed. This is done by raising a clamp, which allows the mold to separate. The red hot brick is now drawn into a kiln, covered over with powdered coal and left to anneal. Each kiln contains 1000 bricks, and is from three to four days in cooling. Four men can make 500 of these bricks in three hours. The loss in the manufacture from breakage is about 20 per cent. These bricks are rough on their surfaces, but on account of their larger size do not require more mortar than an ordinary brick. They do not readily absorb moisture, and for that reason are extensively used in the construction of foundations. In Silesia, these bricks cost 25 per cent. less than an ordinary brick.

In the Hartz mountains the lead furnace slags, which are silicates of iron, are run into molds and compressed, thus forming bricks for building purposes. They are, however, of inferior quality, being very brittle, and houses built with them are usually coated with compo. One of the first successful attempts on the Continent to transform slag into a useful building material was made by M. Sepulcre, a Belgian engineer. His process consists in running the slag into pits having the sides inclined at an angle of about 30°. This quick increase in the sectional area of the pit allows the solid crust which forms on the top of the slag to rise with it without becoming attached; the whole mass of slag is thus liquid, and solidifies from above and under pressure, being left several days to cool. When first turned out the stone thus produced can be readily broken into any required shape; but it gradually hardens on exposure to the atmosphere. The primary conditions of success with this process are that the furnace is in good working order, and that the slag contains about 40 per cent. of silica. If lime be present in excess, the stone will crumble to pieces on exposure. From experiments made by the "Conservatoire des Arts et Metiers," in Paris, with the stone produced by M. Sepulcre's process, it was found that when made from the slag of gray iron it became fissured at a pressure of 3100 lbs. per square inch, and was crushed under 5700 lbs. Stone made from white iron showed fissures at 3450 lbs., but it did not give way until a crushing strain of 12,600 lbs. per square inch had been reached.

Another application of blast furnace slag on the Continent is that of glass manufacture. In Belgium, experiments in this direction proved so successful that it led to contracts being entered into, by the glass manufacturers in some parts of the country, with the proprietors of blast furnaces for the regular supply of slag for this purpose. The only preparation necessary is to run the slag out on to iron plates and to cool it with water. By far the most general method of dealing with slag is to granulate it with the view of its ultimate adaptation to constructive purposes; and this course of treatment is carried out in various ways, both in England and on the Continent. When in Belgium, a short time since, the author visited, amongst other industrial establishments, the iron works of M. Dallemagne, at Sclessin. There the slag is granulated in a very simple manner. On being run off from the blast furnace it is made to pass through a stream of water, which has a sufficient velocity to carry the grains of slag into a pit, from which it is raised and delivered into wagons by an endless chain with buckets attached. The water enters under the slag and the steam formed at the junction of the two is said to materially assist in breaking up the slag. The only labor required is that of a couple of boys, who occasionally agitate the mixture of slag and water, one at one point of entrance and the other near the buckets. The invention of this simple process of disintegrating slag, which is extensively used in Belgium and France, is said to be due to M. Minary, director of the Franche-Comte Iron Company. In these works, which consist of five blast furnaces, each producing 20 tons in 24 hours, the introduction of the system resulted in the saving of the wages of 20 men, who were previously occupied in charging the slags, and of 5 blacksmiths who repaired their tools. The saving effected is from 5000 to 6000 francs per annum. Beyond this saving, however, there is another absolute gain afforded by the utilization of this granulated slag in various departments of the works. The first uses to which granulated slag was there put were as a substitute for gravel, and for making the bed of the casting house. The pigs came out of these beds very clean and bright, and were preferred by the puddlers even to those cast in iron molds. This method of using the slag is now of almost universal application in the Siegen district in Prussia, where most of the furnaces run on spiegel. The cleanness of the pigs cast in slag beds suggested its partial application to molds for fine castings. The fine dust was sifted out from the granulated slag, and with it the molds were sanded, the result being that the castings turned out better and cleaner than before. As may be supposed, these applications only consumed a very small portion of the slag; the surplus was therefore offered to the railway companies, and they find good use for it as a ballast, paying a moderate price for it; the foundries thus obtained a revenue from what had previously been but a source of continual expense. It is stated to make a good ballast; being porous it retains but little moisture and packs very well.

From the first moment that the granulation of slag became an accomplished fact its substitution for sand in construction suggested itself, and its use in this respect has been attended with very good results. It was first mixed with lime and used as a mortar, and some having been left from a job was soon afterward found to have become very solid. This was suggestive of further applications—the preparation of concrete and the construction of foundation walls. To both of these purposes it has been successfully applied. Then followed the idea of manufacturing bricks, and the proprietors of the Georgs-Marienhutte, in Hanover, mix the granulated slag with lime, press and sun-dry the bricks molded therefrom, and have used them very largely in the construction of their buildings. They cost much less than the ordinary bricks, and, being almost white, give a light, cheerful air to the buildings. Another application of granulated slag consists of coating the surfaces of unburnt bricks with it, and burning them out of contact with coal. This produces an enamelled face—an appearance which is much sought after in some places on the Continent. By the admixture of slag sand with fire clay the quality of the bricks made therefrom is said to be greatly improved. This suggests the application of the sand in the manufacture of bricks for puddling furnaces, where a highly refractory material is still a desideratum. The possibility of manufacturing cement from granulated slag has been demonstrated at one of the largest iron works in Germany, where experiments were carried on for several years with the view of determining the point. Large works have been constructed in connection with this foundry, where an artificial cement is manufactured, which is said to be equal to the best Portland cement, and which is produced at a very low price.

The important part which carbonic acid plays in rendering soluble the various mineral substances required by plants for their growth, has led to the supposition that blast furnace slags can be profitably applied for agricultural purposes. Whether German ingenuity has succeeded in the successful application of slag in this respect the author is not aware. That English skill has not been able to effect the object he is aware, as will presently be shown. Hitherto the author has confined himself mainly to the theory and practice of Continental metallurgists in the matter of the utilization of the slag of blast furnaces. He will now proceed to deal with the practical development of the question in England, noticing *en passant* such proposals bearing on the subject as are of interest or value. In this, the home department, as it may be termed, the author is able to supply information of a more precise and detailed character, and to show by diagrams and models the exact form of apparatus used in producing given results, which results, moreover, are themselves illustrated by samples of the various products.

Amongst the earliest scientific investigators of the question of applying furnace slag to economic purposes was Mr. Bessemer, one of our honorary members. In the year 1863, Mr. John Gjers, of Middlesborough, also a member of our Society, patented a plan for granulating slag by running it into agitated water. The sand thus produced was used in place of siliceous sand on the pig beds. Mr. Gjers, however, informs the author that he gave up the practice because in Middlesborough no cover is used over the pig beds, and in wet weather some trouble was occasioned by the slag absorbing and retaining water. Moreover, sand is very cheap in that part of the country, and the iron masters there failed to appreciate the advantages of having a good flux on their pigs rather than a siliceous sand covering, which does not tend to promote good yield either in the puddling or the cupola furnace. With covered pig beds Mr. Gjers experienced very good results.

(To be continued.)

*From "Transactions of the Society of Engineers."

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A San Francisco inventor has applied for a patent on a horse brake of his contrivance. It is intended to control a horse in much the same way as a wagon is governed in its movements by a brake. A buckle with a belt is attached to the ring of the breeching on the left side of the horse, and the belt is continued around the latter's breast, where it is fastened to the martingale. Thence it passes to the right-hand side of the buggy seat, where it is caught by a buckle and a loop. When the reins are pulled tight the brake presses on the fore-legs of the horse immediately below the breast, stopping him instantly, and preventing him from rearing or kicking. Should the reins slip from the hands of the driver or break, the horse can be brought to a stand-still by pulling the strap which is buckled at the right hand side of the seat.

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The Lancaster, Pa., *Examiner* says: Col. W. G. Case has leased the Columbia Steel and Iron Company's rolling mill, at Columbia, and will commence operations at an early day. The operations of the mill, at least for the present, will be confined to puddled iron—muck bars, principally for the Pittsburgh market. This will be good news to the working people of Columbia.

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| " per doz | 6 00 |
| Rings per box (100) coppered wire | 80 |
| " per doz boxes (1200) " | 3 00 |
| " per box (100) tinned wire | 60 |
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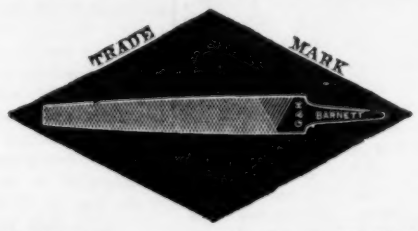


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## Peter A. Frasse & Co.,

**95 Fulton Street, New York,**

SOLE AGENTS FOR

## Thomas Turner & Co.'s Suffolk Works,

**SHEFFIELD.**

## FILES AND HORSE RASPS,

And Importers of

P. S. **STUBS' FILES, TOOLS & STEEL,**

**W. J. Davies' Sons' London Emery Cloth,**

**HUBERT'S FRENCH EMERY PAPER.**

EVERY FILE WARRANTED.

Equal to the BEST.

Western Files. Western Files.

Works, Beaver Falls, Pa. Office, 96 Chambers St., N.Y

Western Files. Western Files.

LARGEST CAPACITY

Of any File Works in the World.

In the face of strong prejudice against American files, this brand has earned a reputation second to none. The trade in all sections testify to their excellence. We confidently offer these files as superior in every respect and cheaper than any first-class file in the market. A trial will confirm their reputation.

**MINOT & CO., 239 Franklin St., Boston,** New England Agents.

**McKINNEY MFG. CO., Hamilton, O.**

Wrought Butts, Strap & T Hinges.

Send for special discount sheets.

## "CHAMPION" Hog Ringer and Rings.

The only Ring invented that will effectually prevent Hogs from Rooting.

Being a Double Ring it is equal to two or three of any other Ring. Having no sharp points in the flesh it does not cause irritation or soreness as in other Rings. The smooth part of the wire being in the nose, it heals rapidly. One of our rings being equal to two or three of any other ring, makes this ring cheaper than the cheapest ring in the market. Time and money saved in using the Champion Hog Ringer. One operation and the work is done.

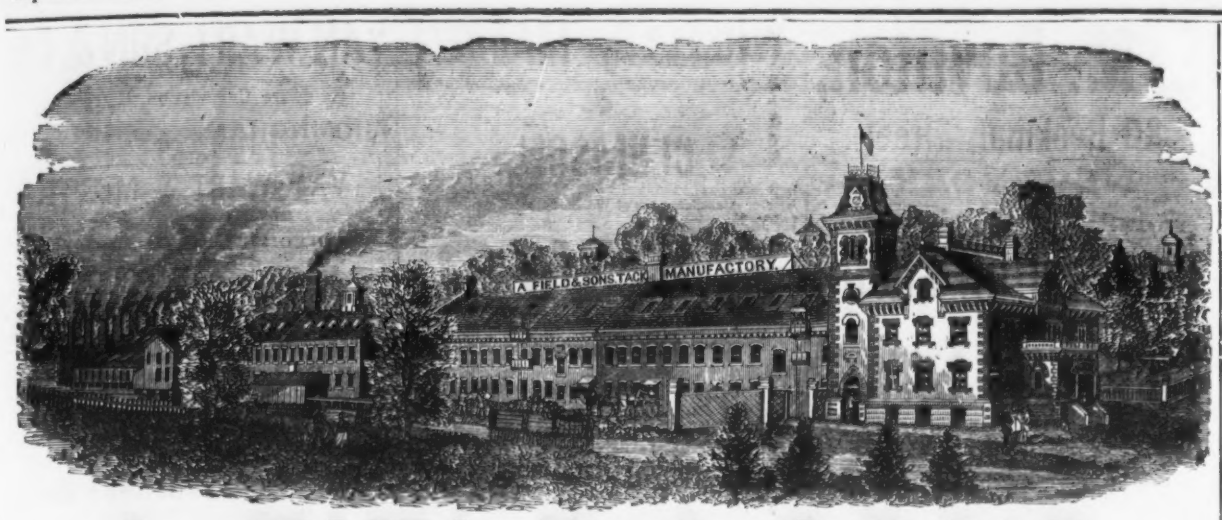
**Price of Hog Ringer, 75c. each.**
**" Coppered Hog Rings, 50c. per 100.**
**Price of Tinned Hog Rings, 60c. per 100.**
**" Hog Holder, 75c. each.**

Discount to the trade.

**CHAMBERS & QUINLAN, Exclusive Manufacturers,**

**DECATUR, ILLINOIS.**

**Original Manufacturers of Tinned Rings.**




# A. FIELD & SONS,

TAUNTON, MASS., Manufacturers of

**Copper and Iron Tacks, Tinned Tacks,**

SUPERIOR SWEDES IRON TACKS. for Upholsterers' Use, Saddlers' Supply, Card Clothing, etc., etc.

**American and Swedes Iron Shoe Nails,**

Zinc and teel Shoe Nails, Carpet, Brush and Gimp Tacks, Common and Paten' Brads, Finishing Nails
Annealed Trunk and Clout Nails, Hob and Hungarian Nails,

Copper and Iron Boat Nails, Paten Copper Plated Tacks and Nails'
Fine Two Penny and Three Penny Nails, Channel, Cigar Box and Chair Nails, Leathered Carpet Tacks,
Glaziers' Points, etc., etc.

OFFICES AND FACTORIES AT TAUNTON, MASS.

WAREHOUSE AT 35 CHAMBERS STREET, NEW YORK, where may be found a full assortment of Tacks, Brads, &c. for the accommodation of the New York Wholesale and Jobbing Trade.

☞ Any variations from the regular size or shape of the above named goods made from samples, to order. ☜

# Hopkins & Dickinson Manufacturing Co.,

FINE METAL WORKERS,

Works, Darlington, N. J. 69 Duane Street, N. Y.

# Hand Made Locks and Real Bronze Hardware.

NEW AND ARTISTIC DESIGNS FOR

Private Residences, Banks, Churches and Public Buildings.

# OTIS PASSENGER —AND— FREIGHT ELEVATORS

For HOTELS, OFFICE BUILDINGS, STORES, WAREHOUSES, FACTORIES, MINES, BLAST FURNACES, &c.

OTIS BROTHERS & CO.
SOLE MANUFACTURERS,
348 Broadway, New York.

THE
**CANADIAN BANK OF COMMERCE.**

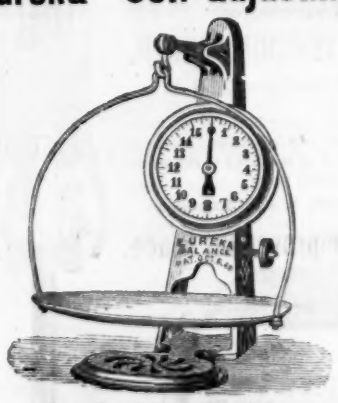
Capital - - $6,000,000, Gold.
Surplus - $1,800,000, Gold.

The New York Agency, 50 Wall St.,

Buys and sells Sterling Exchange, makes Cable Transfers, grants Commercial Credits, and transacts other Banking Business.

J. G. HARPER, J. H. GOADBY, } Agents.

**Eureka Self-adjusting**




**SCALES.**

Have a patented *attachment for* ascertaining the *tare* of a *dish* or other *receptacle* used in weighing *without* the use of *weights* or *loss of time.*

Manufactured only by

JOHN CHATILLON & SONS,
91 & 93 Cliff St., N. Y.

# CROCKER BROTHERS,

32 Cliff Street, N. Y.

# METALS.

Anthracite Pig Irons,

COLD AND WARM BLAST CHARCOAL IRONS,

American and English Bessemer Irons, Iron Ores.

COPPER, TIN, &c.

Advances made on Merchandise.

THE CELEBRATED

# YALE LOCKS

FOR ALL USES.

ORNAMENTAL REAL BRONZE HARDWARE.

YALE LOCK MFG. CO., Stamford, Ct.

Salesrooms, No. 298 Broadway, NEW YORK.

# NEW YORK SCREW BOLT WORKS.

(Estate of R. J. DEWHURST, deceased.)

JOHN COCHRANE, Executive Agent and Manager,

*Office and Works, cor. Ave. D and 11th St., N. Y.*

Bolts, Nuts, Turnbuckles, Washers, Forgings, &c

*The attention of large consumers solicited.*


## Treasury Decisions for March.

The following are some of the decisions of the Treasury Department rendered during the month of March last:

AMERICAN MACHINERY RETURNED FROM ABROAD AFTER USING.

TREASURY DEPARTMENT, March 1, 1875—SIR: Your communication of the 16th ultimo is received, transmitting application of John W. Hoyt, dated Brownsville, Feb. 8, 1875, for free return of a boiler, engine, etc., alleged to have been exported by him to Mexico, Aug. 6, 1874, and to be now in the same condition as exported. The decisions of this Department of Nov. 3, 1868, and Nov. 9, 1869, restricting the free return of machinery of American manufacture, relate only to new machinery, which, being set up and used in a foreign country, could not be returned in the same condition as when exported. But machinery already used would present a different question, and, in returning it to the United States, account must be taken of its condition relatively to that it had when exported. If satisfied that the machinery referred to by Mr. Hoyt is substantially in the same condition, as respects wear and present value, that it had when exported, you are authorized to admit it free of duty.

B. H. BRISTOW, Secretary.
Collector of Customs, Brownsville, Texas.

FIGURES CAST IN METAL IN IMITATION OF BRONZE OR MARBLE.

TREASURY DEPARTMENT, March 25, 1875.—SIR: Your communication of the 9th ultimo was duly received, reporting upon the application of Rev. E. Sorin for free entry of certain statues for the use of the church of the Sacred Heart of Notre Dame, Indiana. It appears by your report, as well as by the entry and appraisement order, that the "statues" in question are castings of iron or other metal, finished in imitation of statues of bronze or marble, but not such in fact. The Department will not preclude the acceptance of professional productions of sculptors in other materials than marble; but the ground on which they claim to conform to the technical description of statues embraced in the law must be made very clear; and, to entitle them to classification as statues, they must be absolutely the professional production of a statuary or sculptor only. The evidence offered in the present case by the importer is insufficient to establish the claim that the figures referred to are such professional productions. The question of the material of which they are constructed is unimportant, and the manner of production, whether by casting or by chiseling, is also not decisive. Duty appears to have been properly assessed upon them as manufactures of the metal of which they are composed, and your decision in so assessing duty is hereby affirmed.

CHAS. F. CONANT, Acting Secretary.
Collector of Customs, New York City.

IRON IN BLOOMS CLASSED AS BAR.

TREASURY DEPARTMENT, March 17, 1875. SIR: Your letter of the 10th instant is received, transmitting the appeal (798 d,) dated March 8, 1875, of J. Henry Rogers from your decision assessing duty at the rate of 1¼ cents per pound, less 10 per centum, on certain Moisic iron blooms, imported from Canada on the 2d instant, the importer claimmg that such iron should pay duty as pig iron, at the rate of $7 per ton, less 10 per centum. The 6th section of the act of February 7, 1875, having placed Moisic iron in the same category for assessment of duty as all other iron, the only question to be determined in this case is, whether the said iron is more advanced than pig iron.

On this question it appears that the iron is not known by the designation of iron in pigs, but is invoiced and is commonly known, bought and sold as iron in blooms (a stage of manufacture in advance of pig iron), and therefore is liable to duty at the rate prescribed for "iron in bars," as assessed by you under the provision in "schedule E," which is as follows: "But all iron in slabs, blooms, loops, or other forms less finished than iron in bars and more advanced than pig iron, except castings, shall be rated as iron in bars, and pay duty accordingly." Your decision is therefore affirmed.

H. B. BRISTOW, Secretary.
Collector of Customs, Ogdensburg, N. Y.

CIRCULAR INSTRUCTIONS RELATIVE TO THE IMPORTATION OF GOODS ON SHIPBOARD, FEBRUARY 10, 1875.

TREASURY DEPARTMENT, March 18, 1875. The Department having, on the 12th instant, instructed the surveyor of customs at Cincinnati, by telegram, as follows:

"The day on which a vessel receiving goods in a foreign port, is fully laden and cleared for departure, is the date defined as that on which goods are actually on shipboard bound to the United States"—thereby recognizing a general rule which might safely be adopted by the customs officers until further and more specific instructions should be given. The following general instructions are now issued for the information and guidance of all concerned:

1. The fifth section of the act of March 3, 1875, providing for an increase of duties, excepts from such increase all "goods, wares or merchandise actually on shipboard and bound to the United States on or before the tenth day of February, 1875."

This exception embraces all such goods, wares or merchandise as were actually on board a vessel bound for the United States, the goods also being destined and shipped for the United States on or before said date.

2. The actual bona fide clearance of the vessel from the foreign port will be held, in all cases, as fixing, prima facie, the date when the goods were actually on board such vessel, and when the date of clearance is not later than February 10, 1875, no other evidence of the fact need be required.

3. When the date of clearance is subsequent to February 10, 1875, but the goods are claimed to have been on board on or before that date, such other evidence may be received as shall be sufficient to establish, beyond reasonable doubt, the fact that the goods were actually laden on board a vessel then actually destined for the United States, no change in the destination of the vessel having subsequently been made.

4. As a general rule, evidence admissible in the cases referred to in the preceding paragraph may consist of original bills of lading, authenticated by a consular certificate, with any other documentary evidence including the "ship's log-book," tending to establish, to the satisfaction of the collector, the actual date and circumstances of the shipment. The affidavit of the master or first mate of a sailing vessel, or of the captain or purser of a steamer, may be accepted as corroborative evidence, and will be required in all cases where practicable.

5. When the collector is not satisfied beyond reasonable doubt, in view of these instructions as to any material fact necessary to the exemption of any dutiable goods claimed to be exempt from the said increase of duties, and in all cases of indirect shipment or of trans-shipment of goods claimed to be so exempt, he will exact such duties, which may be paid under protest, and the question will be considered by this department as in other cases of protest and appeal.

6. In special cases, where it may appear proper to apply for immediate instructions, such application may be made by the collector to this Department, on a full report of the facts and circumstances of the case, so far as known to him, without prejudice to the rights either of the government or of the importer, and further proceedings on the importation will, in that case, be suspended until special instructions are given. Care will be taken, however, by collectors to avoid such applications when not absolutely necessary.

B. H. BRISTOW, Secretary.
Collectors and other officers of the Customs.

VALUE DECLARED ON ENTRY NOT TO BE REDUCED BY CERTIFIED INVOICE VALUE.

TREASURY DEPARTMENT, March 15, 1875.—SIR: Your communication of the 5th instant is received, transmitting the application of O. H. Tully & Co., dated the 27th ult., in which they ask an abatement of duty upon certain differences between the values represented on a *pro forma* invoice entered under section 10 of the so-called Moiety Act of June 22, 1874, and certain consular certified invoices subsequently received representing the same merchandise, which invoices they enclose.

The Department has uniformly held, as will appear by the General Regulations of 1857, 1869 and 1874, that where the certified invoice subsequently shows less than the entered value, no reduction can be made, although if such invoice should present an increase, duties must be levied on the excess.

The act of June 22, 1874, above referred to, permits the importer to make entry in the absence of a certified invoice, upon such data as he may have in his possession. The theory of the law is that he is in a position to know the actual cost or the true market value of the merchandise. The presumption is, that he is not likely to overstate, and there is nothing in the act itself authorizing a reduction on the ground that the invoice subsequently produced shows him to have been mistaken. In other words, he is estopped by his own act from claiming such reduction, and the Department therefore holds, in view of section 2900 of the Revised Statutes, the same rule still applies. Under these circumstances it is proper to hold the importers to the value declared as correct on their original instruction and attested on entry. The invoices inclosed are herewith returned.

B. H. BRISTOW, Secretary.
Collector of Customs, Boston, Mass.

OATHS OF SHIPPERS.

TREASURY DEPARTMENT, March 12, 1875.

Article 658 of the Revised Regulations of 1874 prescribes the following form of oath to be taken on combined entries for warehouse and immediate transportation in the United States:

OATH OF AFFIRMATION OF SHIPPER.

I do solemnly, sincerely and truly——that the goods, wares and merchandise, described in the within entry, now delivered by me to the collector of customs for the port of——are truly intended to be transported in bond to the port of——and delivered to the collector of said port, according to the provisions of the warehousing laws and regulations of the Secretary of the Treasury.

Upon reference to the General Regulations of 1857, and the Warehouse Regulations of 1868, Part V, it will be seen that the foregoing oath was prescribed for an ordinary withdrawal entry from warehouse for transportation, which was only taken after all the obligations of the importer to the government had been received.

Article 467 of the Regulations of 1857, and article 71, Regulations of 1868, prescribed that the oath to be taken on entries for warehouse and immediate transportation should be the same as that taken on warehouse entry, and articles 431 and 27, of the respective Regulations mentioned, prescribed that the oath to be taken on a warehouse entry should be the same as that on an entry for immediate payment of duties. The oath to be taken in such cases is that prescribed by the Act of March 1, 1823, section 4, incorporated in the Revised Statues at section 2841, and is set forth in article 353 of the Regulations of 1874.

In order to hold importers to a more strict responsibility for the correctness of their invoices and entries, in cases of entries for warehouse and immediate transportation, it is hereby directed, that on entries of this class there shall be taken one of the oaths prescribed by article 353 of the Regulations of 1875, with the addition thereto of that prescribed by article 658.

Blank forms for such oaths will be furnished on requisition. B. H. BRISTOW, Secretary.
Collectors of Customs, and others.

## BUSINESS ITEMS.

NEW JERSEY.

Messrs. John Toler, Sons & Co., Newark, have just introduced an entirely new kind of furniture caster, requiring neither screws nor nails, and thus doing away with a great inconvenience. There is nothing to be done but simply bore a small hole with the bit accompanying them and drive home, as fully explained in their advertisement on another page.

Messrs. Grant & Co., Taylor Works, Newark, are manufacturers of light machinery, models, small wares, and sole manufacturers of Widmer's Improved cap rifles and targets, extensively introduced for small sport or amusement in doors and out of doors.

In 1871 the Sargeant Manufacturing Co., of Newark, began manufacturing a general line of saddlery hardware, the productions being at first confined to various styles of plain japanned goods. Among their many specialties may be mentioned harness trimmings made of iron in almost exact imitation of the leather covered article. Another specialty is the "Novelty" and "Newark" patent gig tree, well and favorably known to the trade. A full line of coach trimmings and "Imitation Covered Mountings" is also made.

A new invention has recently been made by Messrs. C. Reese, master mason, and Thomas Johns, superintendent of the mill of the Iron and Steel Company, at Ironton, O. The improvement is practically a double furnace, having a grate at both ends, with the flue in the centre, passing down between the doors under the body of the furnace into the chimney on the other side. The inventors claim that this furnace will do one-half more work, for the reason that the heater can be charging at one end whilst drawing at the other, and that it will save largely in iron from the fact that the cold air passes directly to the flue before reaching the iron.

The charcoal furnace of Messrs. Barlow & Day, at Lamar, Clinton county, Pa., has been blown out. It is known as the Washington Furnace, and has a capacity of 1200 gross tons per annum. In connection with the furnace is a bloomery of eight fires, which has also suspended operations.

# GEORGE GUEUTAL & SON,

39 West 4th St., New York.

IMPORTER OF

Wood Screws, Steel in Sheets,

BAND SAWS, TOOLS FOR BRAZING, &c.

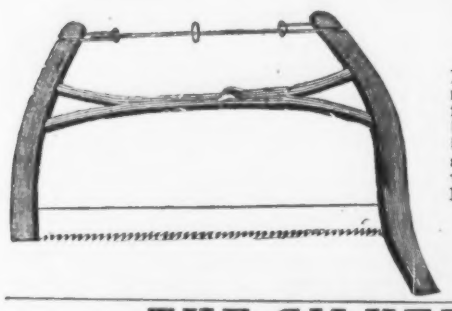
Bed Screws, Pin Hinges, and Wire Nails a Specialty.

# H. W. PEACE,

MANUFACTURER OF

# Saws of all kinds.

FACTORY, WILLIAMSBURGH, N. Y.



## Elliptic Forked Saw Frame.

*Patented June 28th*, 1870.

The annexed engraving represents my ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any center bolt, secures for the Frame great strength and durability. These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

**HARVEY W. PEACE,**

Sole Proprietor & Manufacturer,

VULCAN SAW WORKS,

*WILLIAMSBURGH, N. Y.*

# THE SILVER STEEL DIAMOND CROSS-CUT SAW.

$1.50 Per Foot.

Patent Secured

PATENT HANDLES AND GAUGE INCLUDED.

THIS new Saw, which is destined to take the place of all Cross-cut Saws in point of **SPEED AND EASE**, is manufactured by **E. C. ATKINS & CO., Indianapolis, Ind.**, who are the

**SOLE MANUFACTURERS FOR THE UNITED STATES.**

So confident are we that this is the best Cross-cut Saw in the market that we CHALLENGE THE WORLD. Orders promptly filled.

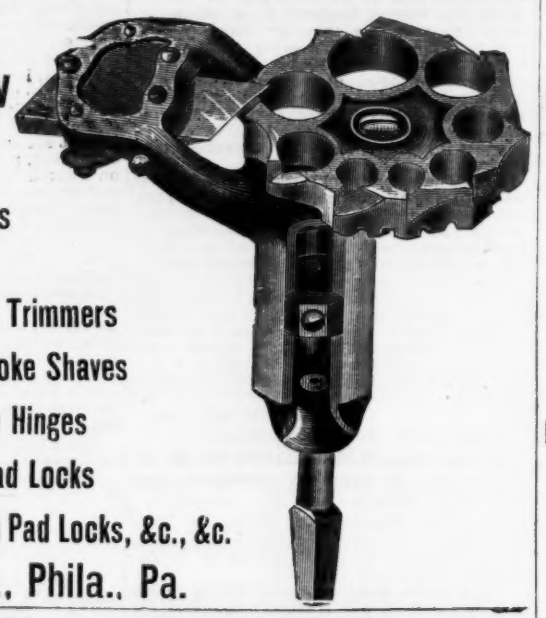
E. C. ATKINS. H. KNIPPENBERG. **E. C. ATKINS & CO.** Saw Manufacturers and Repairers, Indianapolis, Ind.

# Lloyd, Supplee & Walton,

## HARDWARE FACTORS.

MANUFACTURERS OF

## Bonney's Hollow AUGERS.



Stearn's Hollow Augers and Saw Vises

Bonney's Spoke Trimmers

Double Edge Spoke Shaves

Adjustable Gate Hinges

Scandinavian Pad Locks

Flat Key Brass and Iron Pad Locks, &c., &c.

625 Market St., Phila., Pa.

# BILLINGS & SPENCER CO.

Vienna, 1873.

MANUFACTURERS OF

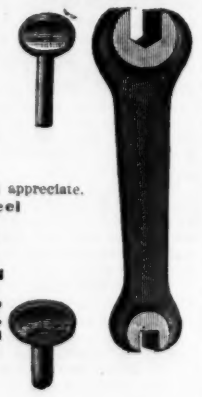
CLAMP, DIE AND COMMON

## LATHE DOGS.

Forged from Bar Steel And Hardened

Under Billing's Patent Process.

For Progress.



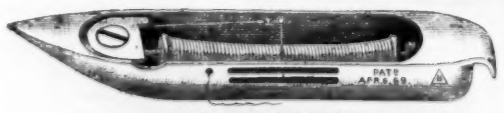
FIRST CLASS ARTICLES,

and something that every machinist and Tool Maker will appreciate. Also, all Descriptions of **Wrought Iron & Steel**

## DROP FORGINGS.

For Machine Handles, Lathe Wrenches, Spinning Rings, Marlin Spikes. Clinch Rings, Thumb Screws. Thumb Nuts, and Parts of Drill Chucks, Sewing Machines. Gun-, Pistols, and

**Machinery Generally.**



TRADE B MARK.

## THE BILLINGS PATENT SEWING MACHINE SHUTTLE,

Thirty Varieties now made, Forged Solid from Bar Steel and Cold Pressed. Also,

Barwick Wheatcroft

**Patent Self-Adjusting PIPE WRENCHES, of all sizes.**

Illustrated Circulars and Price List sent to any order on request

Lawrence St., Hartford, Conn.

# E. M. Boynton,

80 Beekman Street,

**NEW YORK,**

Manufacturer of

## Saws of all kinds.

Also Sole Manufacturer of

## LIGHTNING SAWS.

Two Direct Cutting Edges, instead of one Scraping point.

Note extra steel and durability over the old **V**, outlined on **M** tooth.

***Telegram Dated Oct. 1st, 1874.***

STATE FAIR, EASTON, PA.

To HENRY DISSTON & SONS:

Philadelphia, Pa.

I want you to publicly test that challenge on Cross Cut Saws. Name time and place within thirty days. American Institute preferred. E. M. BOYNTON.

E. M. Boynton gave on Wednesday of last week an exhibition of what his Lightning Saw could do at the Pennsylvania State Fair, in which two men sawed through a sound oak log, 16 inches in diameter, in 17 seconds. Mr. Boynton informs us that his export trade is increasing, he having lately made large shipments of his saws to Australia and other distant markets.—*The Iron Age*, Oct. 8, 1874.

For fuller report of this exhibition see the *Easton Morning Dispatch* of Oct. 1st, 1874.

Henry Disston & Sons cannot furnish Lightning Saws. Why do they imitate mine?

# J. FLINT,

Manufacturer of

ALL KINDS OF

## SAWS

And Plastering Trowels,

**ROCHESTER, N. Y.**

A large Stock of **Cross Cut Saws** constantly on hand. Orders filled promptly. **Dietrich's Double Handle One Man Cross Cut Saw** made with any kind of tooth desired. Our patent method of grinding Hand Saws makes them superior to any in the market. Send for Illustrated Price List.

Putnam's Government Standard

FORGED

## HORSE SHOE NAILS.

Manufactured from the best of **NORWAY** Iron, and warranted to give entire satisfaction.

**S. S. PUTNAM & CO.,**

**NEPONSET, MASS.**

## Rogers' Self-Sharpening HOE.

The best Hoe in market. It will not batter or break. Wears itself sharp. Will last twice as long as any other Hoe, and is warranted to cut the "Bolles Hoe" or any Hoe in market.

For Sale at Manufacturers' Prices by

RUSSELL & ERWIN MFG. CO., - - New York.
BYRNE & FITZSIMONS, - - - Albany, N. Y.
KENNEDY, SPAULDING & CO., - - Syracuse, N. Y.

A. PARDEE, Hazelton, Pa. J. G. FELL, Phila.

# A. PARDEE & CO.,

## 303 Walnut St.,

PHILADELPHIA

MINERS AND SHIPPERS OF

## Lehigh Coals.

The following superior and well-known Lehigh Coals are mined by ourselves, and firms connected with us, viz.

| | |
|---|---|
| A. Pardee & Co. | HAZLETON, CRANBERRY, SUGAR LOAF |
| G. B. Markle & Co. | JEDDO, HIGHLAND. |
| Pardee, Bro. & Co. | LATTIMER. |

OFFICES:

WM. LILLY, Mauch Chunk, Pa.
WM. MERSHON, Agent, 111 Broadway N.Y
WM. H. DAVIS, Agent, Easton, Pa

# WHEELER, MADDEN & CLEMSON,

Manufacturers of Warranted Cast Steel

# SAWS

of every description, including

Circular, Shingle, Cross Cut, Mill, Hand, Roberts' and other Wood Saws,

&c., &c

## Cast Steel Files

of the well known brand of

**Wheeler, Madden & Clemson.**

FACTORIES:

**Middletown, Orange Co., N. Y.**

BRANCH OFFICE:

**97 Chambers Street, New York.**

## BRUNDAGE FORGED HORSE NAILS,

Manufactured from

**BEST NORWAY IRON,**

*by BRUNDAGE & CO. Sold by*

WHEELER, MADDEN & CLEMSON

**Middletown, Orange Co., N. Y.**

make a specialty of the LARGEST SIZES of **Circular Saws**, and call particular attention of lumber manufacturers to the following points of excellence:

**Evenness of Temper.**—The peculiar structure of my furnace subjects all parts of the saw to a DEAD heat, and when dipped in the oil bath secures perfect uniformity.

**Perfect Accuracy in Thickness.**—My saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed BALANCES PERFECTLY, which is proof positive of the right accomplishment of the work.

**Properly Hammered.**—Great care is taken that no saw shall leave my works without due attention in this important particular. A saw too tightly strained upon the rim, or too loose in the center, cannot be successfully run—hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time RUN TRUE. This department is under the personal supervision of myself, who has devoted over *twenty years* to the art of saw making.

I am sole proprietor and manufacturer of the celebrated **"Challenge" Cross-Cut Saw.** Price Lists of all kinds of saws sent on application.

**JAMES OHLEN.**

**V. G. HUNDLEY,**

79 Reade St., N. Y.

## NORTH CAROLINA HANDLE CO.,

(Wilson & Shober, Props.)

Manufacturers of

**AXE, PICK, GERMAN & AMERICAN SLEDGE, and other Handles.**

Full assortment always on hand.

# VAN WART, SON & CO.

Hardware Commission Merchants,

**BIRMINGHAM, - ENGLAND,**

Agents,

VAN WART & McCOY,

134 & 136 Duane Street, N. Y.

**George H. Gray & Danforth,**

48 India Street, Boston.

F. W. TILTON,

17 Old Levee Street, New Orleans.

At each of these places a complete assortment of samples of Hardware and Fancy Goods will be found, including all new descriptions. Sole Agents for

**John Rimmer & Son's Celebrated Harness and other Needles.**

Agents for

**Seydel's "Ashantee" Pocket Hammock**

OSCAR IRVING VAN WART & Co.,

FORWARDING AGENTS.

2 South John Street, LIVERPOOL.

## OVER 28,000 IN USE.

## The Best for Practical Purposes.

**SEVEN SIZES.**

For Sale by Hardware Dealers generally, and by the Makers,

GRAHAM, EMLEN & PASSMORE,

**631 Market St., Phila.**

## JOHN MAXHEIMER,

Patented,

June 9, 1868; April 6, 1869; Dec 23, 1873; Jan. 20, 1874; Dec. 22, 1874.

Manufacturer of

JAPANNED and PATENT EUREKA Bright Metal

## BIRD CAGES.

Nos. 247 & 249 Pearl Street

NEW YORK.

# H. CARTER,

**290 PEARL ST., NEW YORK.**

## Moulders' and Plasterers' Tools,

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AND

## Angular Extension BORER.

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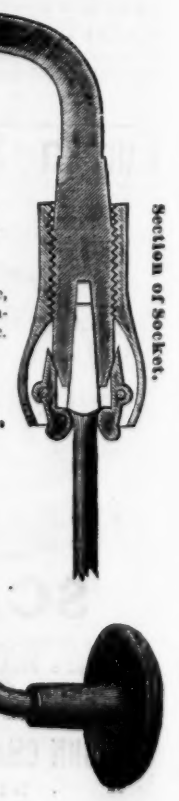
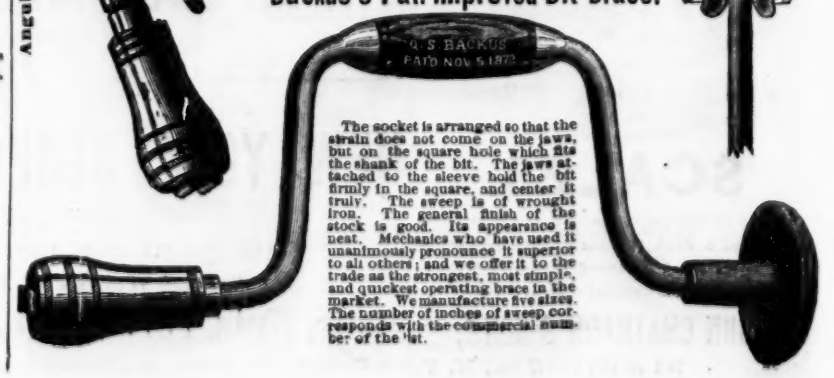


Section of Socket.




The socket is arranged so that the strain does not come on the jaws, but on the square hole which fits the shank of the bit. The jaws attached to the sleeve hold the bit firmly in the square, and center it truly. The sweep is of wrought iron. The general finish of the stock is good. Its appearance is neat. Mechanics who have used it unanimously pronounce it superior to all others; and we offer it to the trade as the strongest, most simple, and quickest operating brace in the market. We manufacture five sizes. The number of inches of sweep corresponds with the commercial number of the bit.

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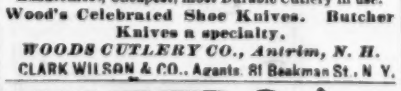

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## PHILADELPHIA CORRESPONDENCE.

PHILADELPHIA, April 25, 1875.

The peculiarly unsettled and depressed condition of the iron trade is exciting very grave apprehensions among those who have capital invested in it, or are in any way connected with it. The fact that the Pittsburgh manufacturers yielded to the demands of the puddlers has unsettled wages in several other localities, where rates were made dependent upon that decided upon in Pittsburgh. Already at several works notice has been given that an advance must be paid or strikes will follow. Under present prices for bars, or, indeed, any grades of manufactured irons, excepting plates and sheets, it is absolutely impossible to pay this or any advance, and the result will probably be a suspension at several works. I am informed, on the best authority, that there is not a single nail works in operation east of Philadelphia excepting that at Fall River, and which is only running part full. Stocks of nails are said to be large everywhere, and even with the reduced output the greatest difficulty is found in making sales. The coal strike in this State has had the effect of causing several furnaces in the Schuylkill and Susquehanna vallies to adopt the use of coke, and once it is found that it can be successfully worked in furnaces with lines constructed for anthracite coal, there is no probability of the latter fuel being again resorted to, especially in view of the great uncertainty of its supply. The situation of the coal strike is more discouraging than has appeared at all hitherto. The miners have resolved to continue the strike to the bitter end, but have guaranteed to preserve the peace if the troops were withdrawn. No sooner was this done in one or two localities than armed mobs commenced the destruction of private property, and in one instance attempted murder. It is clearly evident that the officers of the union, whatever may be their own wishes, have no control over the members, and cannot be relied on. Hence we see the anomalous spectacle of a great Commonwealth like the State of Pennsylvania compelled to maintain an army within its borders to preserve the peace, and at an expense of thousands of dollars daily, to say nothing of the loss to the volunteer soldiery thus called from their business and employment. It is fast becoming a matter which will call for national interference, and ultimately for the enactment of such laws as shall permanently settle the labor question.

One of the noticeable features of the week has been the second annual meeting of the stockholders of the Centennial Board of Finance, and the report of the president, John Welsh, Esq. This report shows a very gratifying and encouraging state of affairs. Not only have the building arrangements been pushed with great vigor, but the finances of the Board are in good condition, some $600,000 in cash being on hand, and the receipts from subscriptions and State appropriations being such as to justify the belief that there will be abundant funds for the completion of all the work. Not only this, but we have the excellent authority of the president for the statement that, should the numbers of admissions reach ten millions, at fifty cents each—a number but little in excess of the number of visitors to the Paris Exposition of 1867—the managers will be able to return every dollar to the stockholders. No further fears need, therefore, be had of the success of the Centennial, and it will, doubtless, result in a magnificent display, creditable alike to both the nation and the management.

I find floating through the columns of the papers a statement, for the truth of which I have no other authority, but give it as quoted. This is that the Round Mountain (probably meant for *Red Mountain*) Coal and Iron Company, of Alabama, has recently shipped, per steamer St. Louis, from Savannah to Liverpool, fifty tons of superior cold blast charcoal pig iron. It is believed that this iron will find a ready sale in Liverpool, and mark the beginning of an export trade. We shall be happy to hear the result of this sale, since the quality of the metal is reported as being especially good, and the matter is one to which *The Iron Age* has of late devoted considerable editorial attention. We also hear of an important trial of anthracite coal, from Johnson county, Arkansas, which was made in St. Louis on the 23d inst. This coal is said to have been a good steam generator, giving a high heat with but little ash, and the statement pronounces one ton of it equal to two of the best Pittsburgh coal. This is highly important for the iron industry of Missouri, if correct, since the greatest desideratum of that state, with its great wealth in ores, is a supply of a good fuel, and this Arkansas anthracite is said to be very abundant.

In ship-building I have to note the award by the government to Messrs. Neafee & Levy of the Penn. Shipbuilding Works, of this city, of the contract for the completion of the Sloop of War Quinnebaug, the price being some $70,000. The same works has now under contract a large propeller for the Montreal Underwriters, to be used for towing and wrecking on the St. Lawrence River. Several other wooden and iron hulls are also in course of construction by the same firm.

The general condition of trade is very unsatisfactory, and there is little of interest in the local gossip of the city.

## A Few Observations on Coal.

Mr. E. W. Binney, in a paper read before the Manchester, England, Philosophical Society, says:

Of late years much has been written on the structure of coal and the various vegetable remains of which it is composed. Observers, examining different coals under the microscope, have, as might be expected, come to different conclusions Some of them have found little else than the remains of spores and spore cases, others only scalariform and cellular tissues and a few spores, and, a third-class, little trace of any structure whatever in the specimens they examined. Splint or hard coal would generally afford the results first named, soft caking or cherry coals the second, and cannel coals the third. Soft coal, yielding a large amount of charcoal inclosed in bright coal, nearly always show plenty of structure in the "mother coal," as well as a few macrospores in the bright portions. Macrospores are nearly always found in abundance in splint and hard coals. In cannel coals they are sometimes found, as well as the cellular and scalariform portions of plants. For many years macrospores were known by the names of spore cases and spores. They could be easily observed by the naked eye in the black parts of the coal, and they were generally considered as sporangia; but Prof. Adolphe Brongniart, in 1868, described a cone (Lepidostrobus Dabadianus) having sporangia full of very minute spores, in fact microspores, in the upper portion, and sporangia full of macrospores, which had been so long known, in the lower part. These observations of Brongniart have been amply confirmed by specimens from the British coal fields. Thirty years ago it was considered that the soft or cherry coals were chiefly composed of the remains of large plants such as Sigillaria, Lepidodendron, etc., while caking coals were formed of plants of a lesser size and much bark, for it has been observed, and since confirmed, that the outsides of Sigillaria, and other fossil trees, sometimes reaching to 2 to 3 inches in thickness, were chiefly composed of bright soft coal showing little traces of structure. In the great lawsuit which was tried at Edinburgh more than 20 years since, as to the nature of Boghead coal, much evidence was given as to its structure, some witnesses finding it scarcely anything else than the remains of vegetables, whilst others found only a stray portion of scalariform structure or a macrospore. Both Boghead and the other brown cannels of Scotland are now generally considered to afford but little evidence of vegetable tissues under the microscope, although numerous remains of Sigillaria and other common coal plants can be seen by the naked eye in them. Notwithstanding that they are so rich in volatile matter, and far exceeding other coals in their yield of paraffin and paraffin oils, they contain from 25 to 30 per cent. of mineral matter in the form of ash. This circumstance has induced certain scientific men to class them as shales rather than coals, notwithstanding that they have the specific gravity of coals. Some years since, when describing several fossil cones affording both kinds of spores, the writer expressed an opinion that the yellow matter seen in the vesicles of Boghead coal was nothing but microspores composed of paraffin or a similar hydrocarbon, and that they were driven off by heat in the form of a yellow vapor, leaving nothing behind but a spongy mass of earthy and carbonaceous matter. The evidence that caused him to come to this conclusion was that the microspores contained in the upper sporangia of Lepidostrobus Harcourtii had all the appearance of crude paraffin, and were of the same yellowish-brown color as powdered bog-coal, and that the latter substance was composed nearly altogether of microspores and mineral matter. So far as his observations extended, microspores had not been observed in coal, although plenty of macrospores, which are generally 1 20 to 1-25 of an inch in diameter, and easily seen by the naked eye, had long been noticed. He had some time since directed his friend, Mr. J. W. Kirby, of the Pirnie Coal Company, to examine the Fifeshire seams of coal in search of microspores, most of those beds yielding macrospores in great abundance, and that gentlemen had lately furnished him with the specimens now exhibited, both splint and soft coals, but especially the former, affording the two kinds of spores. On burning the yellow coal, composed of microspores, a most brilliant flame and a peculiar empyreumatic odor, like that from burning Boghead coal, were produced, whilst the splint coal full of macrospores only burnt and smelt like ordinary hard coal, thus clearly showing that these two kinds of spores differed very much in their inflammable properties and odors given off, and that such properties were certainly not due to the larger spores, but most probably to the smaller ones. The compressed lenticular bodies in the splint coal were formerly of oval and sperical forms with a triradiate ridge on one-half, and although their exterior was composed of a brown cariaceous substance, their interior was full of white carbonate of lime, or bisulphide of iron, according to the nature of the matrix in which they were found; thus suggesting the idea of their having been filled with granules of starch when in a living state, which it is probable they would have been in case of their being germinating spores. He and his late partners at Bathgate, when manufacturing paraffin oil there, had tried various means, by subjecting Boghead coal to the action of ethers and naphthas, to dissolve out paraffin from it, but they had never succeeded; so the yellow matter in the coal may probably be changed into paraffin by the heat employed in distillation. Dr. Schorlemmer, F. R. S., who has been so kind as to examine the microspores found in the Muiredge splint coal, is of opinion that they are not composed of paraffin, but some other hydrocarbon. This may, therefore, change into paraffin by the application of heat in a similar way to what the yellow matter in Boghead coal does. The macrospores are about 320 times the size of the microspores, and constituted the germinating spores, while the microspores were the fertilizing agents, both having been contained in one cone. Several specimens of fine bright soft coal, between two and three inches in thickness, taken from the outsides of Sigillaria and other fossil trees, were exhibited. In these there was no appearance of charcoal spores, or vegetable structure, and in every respect they resembled the black shining parts of soft cherry and caking coals, which generally afford no distinct traces of vegetable structure. Hence from his observations he was led to conclude that soft or cherry coal was chiefly composed of the bark, cellular tissue, and vascular cylinders of coal plants, with some macrospores and microspores. That caking coal had much the same composition, except that it contained a greater proportion of bark in it. That splint coal had a nearly similar composition, but with a great excess of macrospores. The cannel coal, especially that yielding a brown streak, was formed of the remains of different portions of plants with a great excess of microspores, which had long been macerated in water. These conclusions were arrived at merely as to the composition of the different kinds of coal. No doubt each seam would be materially affected by the nature of the roof, whether the latter was an open sandstone or a close and air-tight black shale or blue band, for the former would allow the free escape of gaseous matter, and the latter would prevent its escape. It is well known that the character of the roof has a deal to do with the quality of the coal under it.

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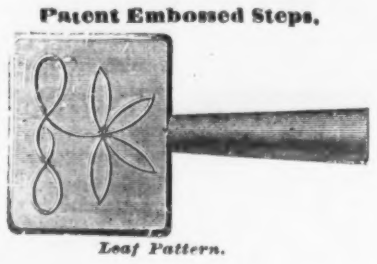
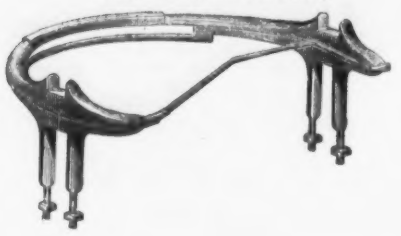
Patent Embossed Steps.



Leaf Pattern.

King Bolt Yokes.

No. 6 Fifth Wheels.

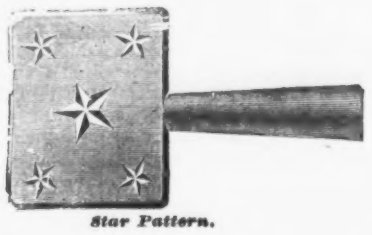


1871 Pattern Shaft Couplings.

Patent Cross Bar Steps.

Upper View.

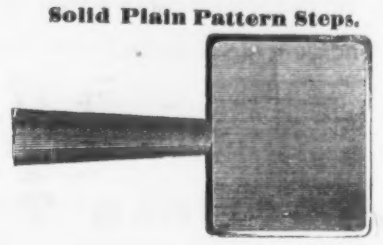
Lower View.



Star Pattern.

Smith's Improved Philadelphia Pattern Slat Irons.

Solid Plain Pattern Steps.



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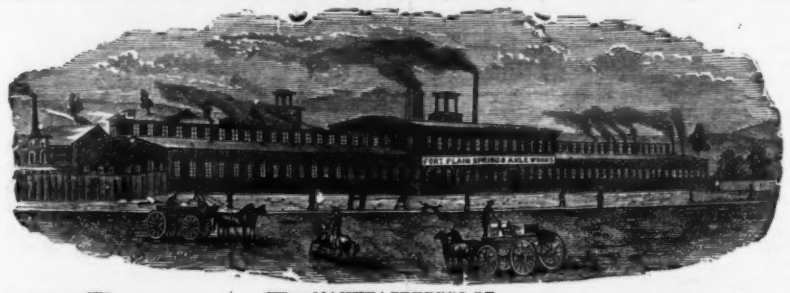

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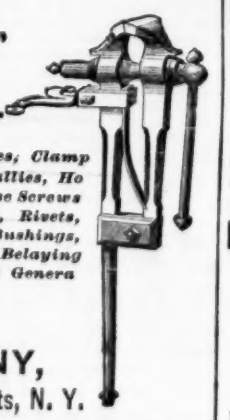

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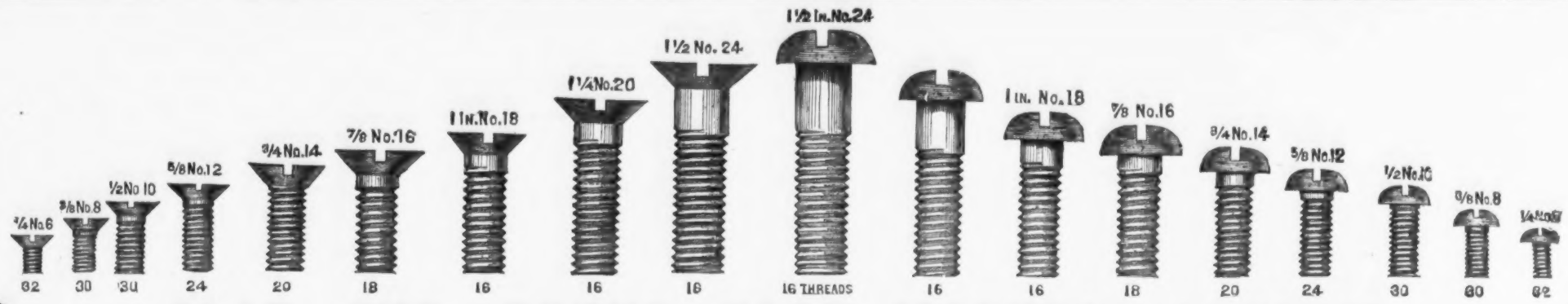


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AND LENGTHS - - ¼, ⅜, ½, ⅝, ¾, ⅞, 1, 1¼, 1½ INCH.

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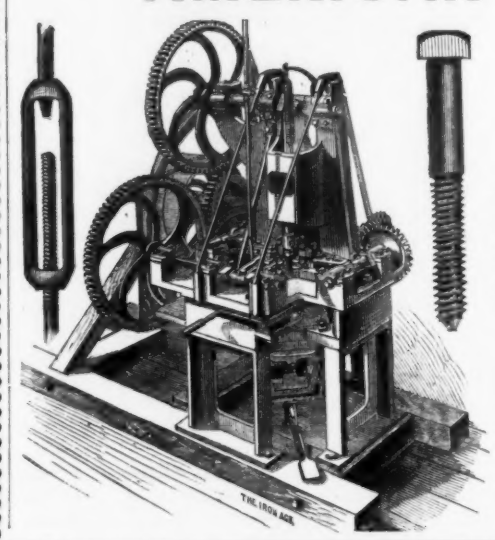

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PAWTUCKET, R. I.
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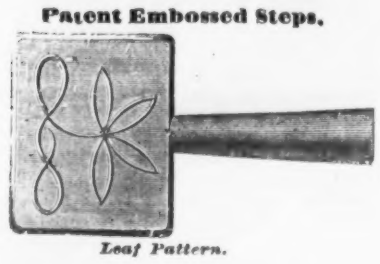
...utage
...work for
...at will not
...g a goodly
work, we can
of these things;
...o you good policy,
...y ask you to believe
...mmendation, I am ac-
bring the good ship of
port of victory, and by
[Signed]
JOHN F. WALSH, President.

# H. D. SMITH & CO., PLANTSVILLE, CONN.

Patent Embossed Steps.



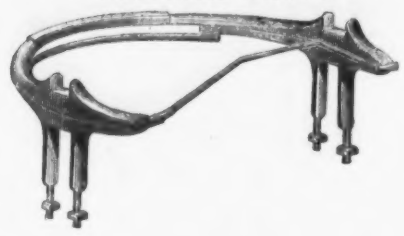
*Leaf Pattern.*

*Star Pattern.*

Established 1850.

King Bolt Yokes.

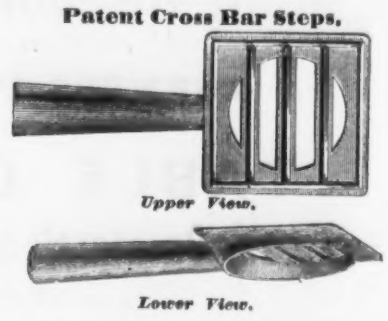
No. 6 Fifth Wheels.



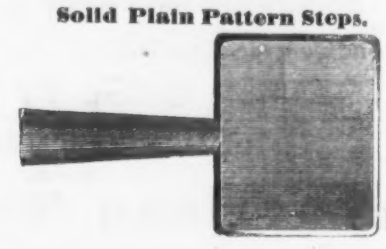
1871 Pattern Shaft Couplings.

Smith's Improved Philadelphia Pattern Slat Irons.

Patent Cross Bar Steps.




Solid Plain Pattern Steps.



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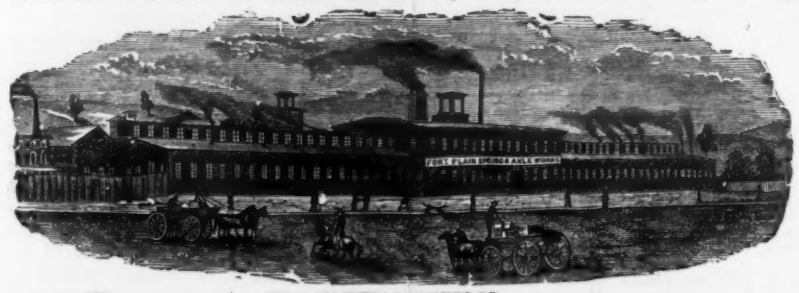

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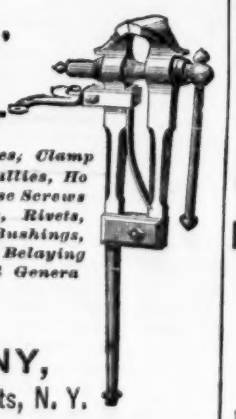

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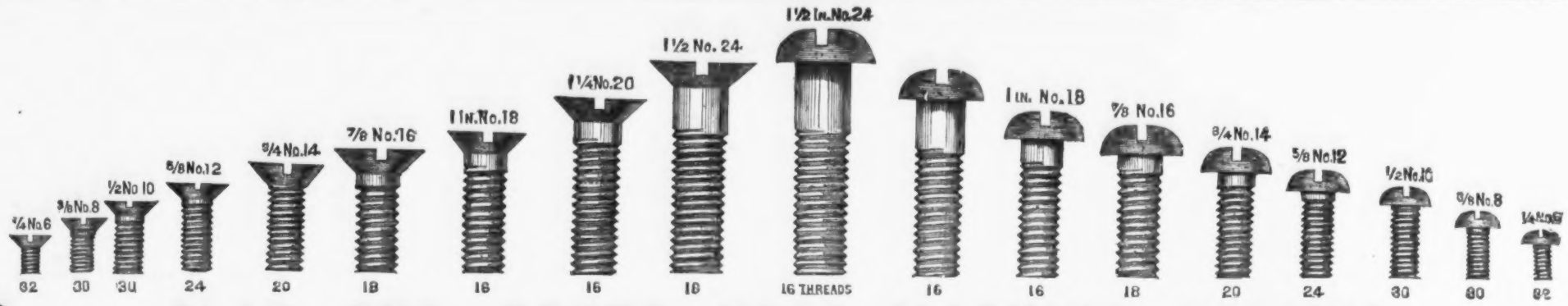


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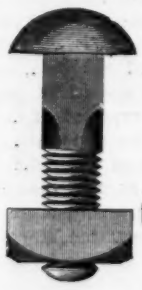

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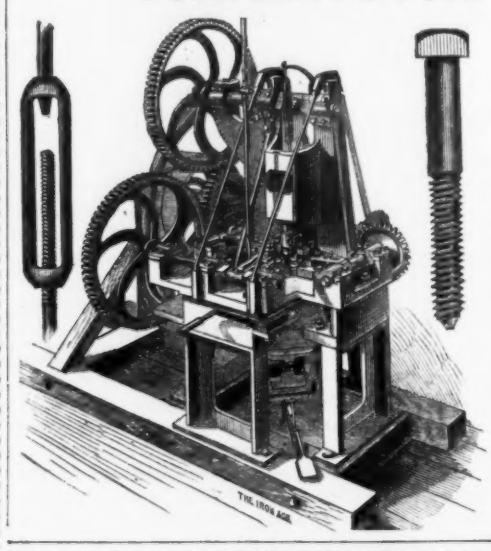

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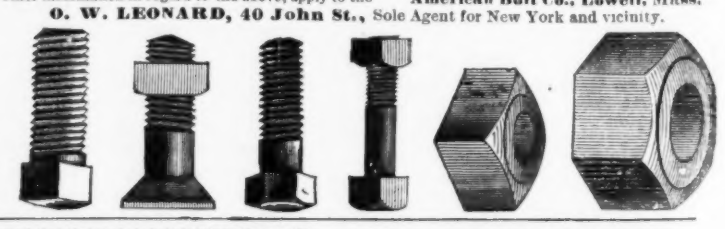

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JOHN S. KING - - *Business Manager.*

NEW YORK, January 2, 1875.

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## Art in Manufactures.

The thoughtful person who will take pains to call to mind the present state of decorative art, as applied to matters of common use, cannot fail to be impressed with the recent wonderful development of popular taste. This is evidenced chiefly by the increasing application of the principles of true art in all the classes of manufacturing industry to which art can be applied at all.

In 1851 France stood at the head of the world in the artistic decoration of common objects, and England found herself so far behind at the great Exposition that she could not even enter a market to compete with France. Industrial art was a thing unheard of and unknown in Great Britain. English manufacturers felt that if they were to compete with France in the markets of the world their goods must be beautiful—must please the eye. Simple excellence of quality would not answer. The great exhibition only served to show that they had no chance for competition. What the condition of the United States was at that time may be guessed from the fact that we got most of our designs for ornamentation from England. The British manufacturers, with an energy which could well be imitated here, at once began the founding of industrial art schools all over the country, and the study of art was so vigorously pushed that in 1867 the London Exhibition, as well as the French Exposition Universelle, showed that England stood ahead of France in the application of the arts of design to the decoration of common articles. Up to this time the United States had done nothing. The public taste had hardly been cultivated enough to recognize a good pattern from a poor one. Wall paper, carpets, furniture, architecture, hardware, gas fittings and ornamental bronzes were of the most inartistic designs, poor in execution and utterly bad in every way. It is true that public taste began to show signs of improvement between 1865 and 1870, but it was not very decided, and was mostly confined to fancy articles and specialties in the stationery line, and not to the more important matters connected with the house furnishing and hardware trades. The great era of improvement has been the last five years. America is feeling the influence of the English industrial schools, in some respects, to a greater degree than England herself. Like the French, the Americans seem to have more of artistic taste in the commoner matters of life than the English, and hence the effect of English art publications and foreign designs generally have been quickly appreciated and adopted in manufactures which, in England, are not supposed to have any relation to art. American architects have done a great deal toward this. As the rule, only the best designs from abroad are published, and as our architects had to go abroad for designs, they came in contact, in foreign books, with only the better class of work; so, willing or unwilling, they got better instruction than a foreigner of equal taste would have received if turned loose in the Old World with good, bad and indifferent examples from which to study. This has been America's only art advantage; the poorest of foreign work is not likely to be brought across the Atlantic, so we do not have so much of it to mislead us.

As an example of one of the branches of metal work which shows a wonderful state of advancement, mostly attained within a few years, we may note cornices for buildings. There was a demand for a metallic, fire-proof cornice. They were at first simply imitations of the old wooden cornices, which were, in turn, imitations of stone. The cornice now can hardly be said to be imitative. It has a variety and beauty peculiarly its own. No pattern seems to be too complex or too difficult to be reproduced, and our architects seem to vie with each other in elaborating designs suitable for metal work of this kind. We know of many designs for this kind of work which it would be impossible to produce in any other material than sheet metal. In appearance they most nearly approach carving, but there is no material capable of being carved that would stand working into such shapes. In artistic design they are far in advance of anything produced even five years ago.

In bronze work the amount of taste and art displayed is surprising, when we consider that it is only a few years since the manufacture of this class of goods was undertaken here. Compression bronze hardware was, we think, the first that entered the market. The process enabled the manufacturer to make real bronze work, which needed no finishing by hand, and yet retained every tool mark of the original. The saving of expense was great, and a demand for bronze hardware was established. This trade has become so great that bronze finished in the ordinary way is also in demand. The bronze hardware is cheap, desirable, and, above all, beautiful. We have hinges, knobs, latches, knockers, bell pulls and door plates of various kinds in real bronze metal, artistically perfect in all respects—accurate copies, in fact, of the work of some of the best foreign masters. The fact is significant that these good things are already imitated in iron, showing that even when cheap goods are wanted, those which are shapely and beautiful command the market.

In lamps and gas fittings the beauty of the present styles, as compared with those of a few years ago, cannot fail to attract attention. Here the demand is for good work in an artistic sense. The lamp itself must be good, for the public will not tolerate any departure from a perfect burner even in the cheapest lamp, and improved machinery renders it needless to attempt to sell a second-class article. In addition to this, beauty of form, elegance of design and general grace is demanded. Iron lamp fixtures, if painted and labelled iron, would still be intrinsically good, and they are driving unsightly goods out of the market. In gas fixtures the same thing is even more plainly seen. A person cannot walk through one of our large stores devoted to the display of all kinds of gas fixtures, and not be struck with their artistic superiority over those in the market a few years ago. This improvement is marked, whether the work be expensive or cheap. They must be good in an artistic way, or the public will not have them. In imitation bronze gas fixtures, the work of the present time is surprisingly good. It takes an expert now to say which is the figure made from the soft metal and which that from the real bronze. And here again the public taste does not ask for an imitation of bronze, but something beautiful that shall be durable, and the soft metal statuette or ornament electro-plated and bronzed, fills the want exactly.

In the stove trade, a few years ago, there was nothing in the way of ornament that could by any means be called either appropriate or beautiful. At the first they were so utterly devoid of ornament that they were little more than cast or sheet iron boxes. Then came an era of ornament, and it seemed that the object of the stove was to show the ingenuity of the carver employed by the pattern maker. If anything grotesque could be devised, the stove was sure to have it. Happily that day is passing by, and the theory of tastful ornamentation is getting to be better understood. A walk through the show rooms of any dealer in mantles, heaters, stoves, etc., will surprise one who has not kept up with the more recent changes in form and general styles. Low grates relieved with polished metal rods, perforated iron fenders cast separate and used for screens, highly finished moldings often combined with marbleized work, give a richness and beauty that is very attractive. Here we meet the process of marbleizing. In the slate and marble regions, where the cost of the real and the imitation is almost the same, and there is only the beauty and durability to influence a decision, the marbleized mantle is preferred, because it is more beautiful and retains its beauty longer than the real article, and because effects are possible with it that cannot be obtained in any other way. In other words, the beauty and usefulness of the article outweighs all other considerations. Nickel plating combined with black polished iron work is one of the most effective of the good things introduced within a comparatively short time. Dealers now so generally recognize the fact that a finely finished stove will sell, that they expend heavily for new patterns and attractive styles even when trade is dullest, because art and beauty find a market for themselves at all times.

In Canada, and to some extent in Australia, American goods come into successful competition with English manufactures less in price, and perhaps fully equal in quality. The reason is found in the better shape, lightness, convenience, and general appearance of our manufactures. There are large firms now in successful operation, established recently, whose success is founded upon an ability to do finer and handsomer ornamental iron work than anybody else, and confining themselves almost exclusively to the production of artistic work in iron and bronze, and copying only the best models to be obtained abroad, they have, in spite of the dull times, succeeded in building up a large and flourishing trade.

To the intelligent manufacturer, the development of public taste is a phenomenon which presents itself in many practical aspects which he should carefully consider. The fact that our markets are now supplied with manufactures of all kinds in which artistic taste is displayed in greater or less degree, shows that, as the rule, our manufacturers are fully aware of the importance of keeping up to the standard of the popular requirements; but there is a vast field for success and profit open to those who will intelligently undertake to lead progress in this direction. Much as we have raised our standards of beauty and utility during the past few years, there is still room for unlimited advancement in the application of high art in ornamentation, and the manufacturer who can succeed in pleasing a correct and discriminating public taste, whether he makes calicos or hardware, bronzes or architectural iron work, will find substantial success easy of attainment.

## The Government Tests of Iron and Steel.

Nothing perhaps within the range of man's possible attainment is more desirable than an exact knowledge of the strength of the iron and steel employed in the various departments of the arts. Everywhere human lives have to be trusted to the strength of iron and steel, and too little strength in that iron or steel may mean the utter destruction of the human beings who are placing their dependence on it.

The ancient answer to all such questions was to make the piece "big enough" and it would stand, but in the complex structures of the present day the parts may be made so large that breakage will be an inevitable consequence. There are numberless cases in engineering where, as in the building of a railroad car, the making of a part too big means disaster, as the weight entailed by the increase of material loads the whole structure beyond endurance. Bridges have failed repeatedly because men did not understand the strength of the materials from which they were building.

What the public want is an accurate knowledge of the properties of the irons and steels in general use; they desire to have some idea of what they can depend upon when they use a bar of a given brand of metal. The results, too, need to be worked up in convenient form available for ready reference; not popularized, but the people brought up to the point of understanding and easily using the results obtained.

It has been well said by one of our most accomplished and scientific engineers that the tables of the strength of materials were really only "data for accurate guessing." This was a man who in his youth was the laughing stock to many of the profession, as an over scientific man, all mathematics and book knowledge. Our tables answer very well as far as they go, for a foundation upon which sound judgment is to be exercised. What we want just now is to have tables which will give us all that we desire in the way of exercising our judgment. To know just how metal acts under a load up to the breaking point is often more important than to know just how many pounds it took to rupture the bar. To know that a piece of cold rolled shafting is exceedingly stiff in resisting torsional strain is a fact much more valuable than to ascertain at precisely what tension per square inch the piece broke. Materials in masses, as a rule, do not possess a strength equal to the units of which they are composed. Thus, a steel bolt 6 inches in diameter does not begin to have the strength that a number of small bars presenting, in the aggregate, a cross section of equal area. In the cases of a few metals we know just what this smaller resistance will be. In other cases we are in profound ignorance. Private experiment has done what it could, and has given us a vast amount of information, whose value is beyond compute, but after all that has been done we may be said to have only reached a point where we understand our deficiencies and know how to supply them if an opportunity is offered. Prof. Thurston's recent experiments developed some very extraordinary phenomenon in the breaking of iron, namely, the increase of strength shown when the strain is removed or the iron given a rest, even if under strain. Mr. Partridge's experiments at the car builders' rooms showed that a few seconds only were needed to develop this increase of strength in the breaking iron. Here is a subject which will richly repay further investigation, and yet it is one that only the government can investigate to the best advantage.

The testing of materials in masses requires heavy machinery and great skill and care, and to be of value to all, must be likewise done by the government. But to even commence an enumeration of the points to which the attention of the iron and steel commission will be directed would be far beyond the space which can be devoted to the subject here.

## Cast Iron and Wrought Iron Radiating Surfaces.

During the past few weeks we have received a large number of pamphlets and circulars from stove manufacturers, in which the comparative healthfulness of cast iron and wrought iron stoves and furnaces is discussed at more or less length. From a somewhat careful reading of these publications, we are forced to the conclusion that the subject is one which is much more generally discussed than understood; and as it is one of interest to a very large class of our readers, we will give a brief summary of the results reached by the most thorough and intelligent experiments with heating apparatus which have ever been made, and which, so far as they go, may be accepted as conclusive.

The question under consideration is whether air is vitiated or contaminated by contact with hot iron plates: if so, under what circumstances? Some years ago the subject was very fully and exhaustively investigated by the French Academy of Art and Sciences. A committee of eminent scientists undertook a series of experiments with both cast and wrought iron stoves, to determine whether air, both dry and moist, heated by contact with iron, was vitiated by the presence of carbonic acid or carbonic oxide. Animals were made to breathe the air heated by passing over red hot plates, and their blood was subsequently analyzed to determine whether carbonic oxide was present. They found that it was. This gas is extremely poisonous, and will destroy life if taken up by the blood in sufficient quantity. Even when largely diluted with atmospheric air, it will, if inhaled, produce a sensation of oppression and tightness of the head, and ultimately acts as a narcotic poison. The same method of investigation did not reveal analogous effects when the air was heated by passing over wrought or sheet iron. One member of the committee, General Arthur Morin, Director of the Conservatory of Arts and Trades, Paris, and one of the most distinguished technologists of the French Academy, in a report summarizing the conclusions reached from all the experiments, says: "The "carbonic oxide, whose presence has "been proved where stoves of cast "iron are used, may arise from several "different causes; 1st, the permeability of "the stove by that gas, which will pass from "the interior of the fire pot to the exterior; 2d, the direct action of the oxygen of the air upon the carbon of the "cast iron heated to redness; 3d, the decomposition of carbonic acid contained "in the air, by its contact with metal "heated to redness; 4th, the influence of "the organic dust naturally contained in "the air." Another very important conclusion was reached by the commission, and given in the report as follows: "The result shows that all stoves and heating apparatuses of cast iron, and even those of "wrought iron, should be lined with fire "brick or other substances which shall "prevent them from attaining a red heat." In a treatise subsequently written by Gen. Morin, on "Warming and Ventilating Occupied Buildings," translated for the Smithsonian Institute report for 1873, we find the following relating to the injurious effects produced by cast iron stoves: "According to direct and careful experiments "made in 1867 by H. Deville and Troost,* "cast iron at a red heat readily allows the "passage of gas, especially hydrogen and "carbonic acid." Further on in his treatise, Gen. Morin says: "If a fire brick lining, "which is easily renewed, be placed in the "stoves, the excessive and sudden overheating of the iron and the rapid destruction of the metal will be prevented, and "the unpleasant effects resulting from the "use of cast iron stoves much diminished."

This may be accepted as a scientific statement of the facts of the case. It shows, first, that cast iron stoves should never be allowed to become red hot; second, that cast iron gives off poisonous gases at a red heat, which wrought iron does not do in the same degree, if at all; third, that all stoves, especially those made of cast iron, should be lined with fire brick. To these conclusions, we may add our own, that all furnaces and stoves should be large enough to do the work expected of them without rendering it necessary to raise the temperature of any part of the radiating surface to a temperature even approaching red heat. When these precautions are all observed, a well made cast iron stove or furnace with tight joints may, so far as we know or can learn, be used without danger to health. The temperature at which cast iron is red in the dark is about 700° F. We should not advise the heating of cast iron radiating surfaces above 400° to 500° F. When they do not much exceed this maximum, pure air passing over them will not be vitiated any more than by contact with wrought iron at the same temperature. At the same time the volume of air heated should be so large that in passing through the furnace it shall be not heated above 200° F. at any time, because many of the constituents of organic dust will begin to char at or about that point, giving rise to unpleasant and unwholesome odors. In very many cases we believe that it is the gases resulting from the charring of organic particles floating in the air which render furnace heat disagreeable and deleterious. It is not desirable to maintain the temperature of an occupied apartment or building above 75° F. If it falls below 70° F. it will not be considered warm enough for comfort by a majority of people, especially those of sedentary habits. If this temperature can be maintained by keeping the air passing through the furnace below 200° F, so much the better, but 200° or 212° should never be exceeded. As we have often said, the practice of using small furnaces and driving them in cold weather,

*Comptes rendus de l'Academie des Sciences, 13 Janvier, 1868.

is utterly bad. Air heated in this way is unwholesome without question, and cannot be breathed with safety. If we must use small stoves and furnaces and make them red hot in very cold weather, they should by all means be wrought iron, but only ignorance and extravagance combined would prompt such a course on the part of a housekeeper. In these remarks we have taken no account of the presence of sulphurous gases in the air flowing from the registers. These have no right to be there, and never will be in well built furnaces with tight joints. If the smell of coal gas is detected in a house, when fires are freshly made or coal is put on, it may be accepted as conclusive proof that the furnace needs repairs which should not be postponed.

The question whether air heated by stoves or furnaces requires to be charged with moisture has been much debated. To this we say, under some circumstances it is necessary; under others is not necessary. When the air supplied to a furnace is already saturated with moisture, as in very hot seasons or in foggy, damp or rainy weather, especially near the sea coast, it does not require additional moisture to be given to it in the furnace. On the other hand, in the mountain districts, as well as in all the Northern and Eastern States during extremely dry and cold winter weather, when the air has been dried to an unusual extent by the freezing of its moisture, it becomes absolutely necessary to restore to it when heated a part of the moisture which it has lost. At such times and in such climates air warmed by stoves or furnaces without vapor pans, robs the skin, lungs and air passages of the throat of the moisture necessary to health and comfort. In this respect a little intelligence and common sense, aided, perhaps, by the use of one of the simple little instruments for determining the relative amount of moisture in the atmosphere, must be brought to bear by the housekeeper. A large volume of air moderately heated will require, of course, much less added moisture than a small volume maintained at a high temperature. It is possible to impart too much moisture to the air, and when this is done the effects are, practically, as bad as when too little is given it. We shall speak more fully on this point in a future issue.

## The Coal Strike.

It begins now to look as if the great coal strike was slowly but surely coming to an end, and that the men who have stood idle for so many weeks will finally have the satisfaction of going to work again at the prices they refused when the strike began. The "secret circular" of Walsh, president of the Miners' and Laborers' Benevolent Union, published on another page, shows the weakness of the position now held by the men. The treasuries of the union are nearly, if not quite, empty, and we imagine that the associations not immediately concerned in the strike are getting tired of paying money for the support of what is already regarded by them as a lost cause. A miner in the employ of the Delaware, Lackawanna and Western Railroad Company, who has regularly contributed of his earnings to support the Schuylkill strikers, and who lately visited that region, remarked the other day in the hearing of the writer that he and his fellow miners had about reached the conclusion that if any more of their money was to be spent for whiskey, they would spend it themselves. In another respect the strike was a failure. It was expected it would be general throughout the whole anthracite region. Those who organized and managed it gave the men to understand that the Lackawanna miners would join. This they have refused to do, and while the mines of the Schuylkill, Lehigh and the lower portion of the Luzerne districts are idle, the operators of the Shamokin region are keeping the market so well supplied that nothing approaching a general coal famine would result from an indefinite prolongation of the strike. Philadelphia seems to be worse off in this respect than any other market, but a scarcity there will not strengthen the strikers, for supplies from Scranton will avert all danger of a coal famine. The operators can afford to hold out and the miners cannot, so we think it will not be many weeks before work at the mines is generally resumed on employers' terms.

No true friend of the workingmen will regret this failure on the part of the miners to resist the inevitable and desirable decline in wages which the events of the past two years have rendered necessary. During that time there has been an average decline of twenty five per cent. in the prices of useful commodities of all kinds, and workingmen in all trades must share with the consumers of their products the benefits of cheapness which they enjoy as consumers of the products of those engaged in other industries. It is natural, perhaps, that every man should seek to delay or resist in his own case the decline in wages which benefits him so much when it takes place in the case of those who supply his wants, but it is nevertheless unphilosophical, especially in the case of the miners, since the price of coal is an important element in the cost of all classes of manufactures. Much of the false and illogical reasoning which often renders the councils of the trade unions so prolific in mischief, may, we think, be attributed to the fact that, as the rule, the workmen cannot realize that their interests as consumers are quite as important to them as their interests as producers, and that it is not so much the amount of their wages as their purchasing power which measures the value of their labor. When this fundamental truth of political economy shall have been hammered into the heads of our workingmen by rude experience, strikes will become as few in number as they now are barren of good results to those who engage in them.

## The Continued Depression in the Tin Market.

The upward tendency in tin which developed in the markets of England and Holland during the latter part of March, has been followed by a recoil as rapid as was the temporary improvement. A glance at the change which has taken place in the statistical position of the metal since the beginning of February will be interesting:

THE VISIBLE SUPPLY OF TIN.

| | 1875. Feb. 1. tons. | 1874. Feb. 1. tons. | 1875. Apr. 1. tons. | 1874. Apr. 1. tons. |
|---|---|---|---|---|
| Stock of foreign tin in London | 3,952 | 2,336 | 5,079 | 1,977 |
| Banca tin in Holland | 1,015 | 1,070 | 327 | 777 |
| Ban tin in Company's hands | 3,246 | 3,298 | 3,340 | 3,035 |
| Billiton in Holland | 982 | 847 | 950 | 767 |
| Afloat for Europe (East India tin) | 1,950 | 1,450 | 1,800 | 1,950 |
| | 11,145 | 9,001 | 11,496 | 8,506 |
| Value of Straits | £91. 10/ | £115 | £89 | £88 |

The foregoing shows that, while the general increase in the visible supply during the two months was but 351 tons, the excessive arrivals from the Straits settlements swelled the stock of foreign in London from 3952 to 5079, the increase under that head alone being 1127 tons. Banca tin, of which the deliveries were liberal from private hands, shows a total decrease of available supply of 594 tons, while Billiton has kept quite steady, losing in stock only 32 tons. The afloats for Europe declined 150 tons.

The weak point has consequently been the steady augmentation of arrivals from the Straits, where production develops on a scale more ample than had been anticipated. At the same time there is no abatement in the receipts from Australia, there being afloat for London on the 1st of April 1950 tons. In March, the Straits shipped to Europe 800 tons; Australia, 525 tons.

While the available and prospective supply was large, the deliveries, considering the generally dull state of the metal trade in Europe, continued most satisfactory, and were no doubt instrumental in fostering the March speculation for a rise. There were, indeed, delivered in March alone in Holland 660 tons; at London, of Straits and Australian, 770; together, 1430 tons; against 1230 during the corresponding period in 1874. The bi-monthly government sale in Holland was coincident with the publication of statistics of the visible supply, March 31, and the latter, especially of Straits tin, being considerably larger than had been expected, the average selling figure proved a serious disappointment, and started the metal once more on its downward course.

While the price was temporarily rising, several arguments were put forward which were intended to place the prospective position of the metal in a more hopeful light, the principal one being that the Australian mines had begun to show shallowness, and would soon give evidences of a gradual decline. Assertions of this kind are easily made, but they will not meet with ready credence till there is actual proof of a diminished output. For example, we are periodically assured that the Cornwall mines will, of necessity, have to go on declining, as the business of tin production in that locality proves ruinous at the low prices ruling. But the surviving mine owners, under a forfeiture of shares not paying the required assessments, manfully struggle on, producing 10,000 tons last year against 9970 in 1873 and 9560 in 1872.

The joint production of Malacca and Dutch East India tin has been fluctuating of late years between 14,000 and 16,000 tons, having been 14,355 tons last year, against 14,298 and 15,934 in 1873 and 1872. Reports from Singapore and Penang, lately to hand, are contradictory, some favor the supposition that, if anything, we may expect an increase and perhaps a return to the yield of 1872; while other accounts, particularly from Penang, speak of a decrease from the lack of rain. Every thing connected with Australian production wears a promising look. Although laboring under many obstacles of a local nature, the Australian miner has imbibed the spirit of his Californian prototype, and through the instrumentality of co-operation manages to successfully develop the rich deposits which underlie that exuberant soil. Not that he again expects to double his output within the current year, but at all events the signs thus far apparent show no decline. The general tin production, which from 25,644 tons in 1872 had risen to 27,258 tons in 1873 and 30,155 tons in 1874, will in all likelihood keep up about the same proportion of annual increase of between 5 and 10 per cent.

On the other hand, the prospects of a proportionate increase of consumption in Europe and America are most reassuring, judging from the deliveries we have been recording since the beginning of the year. If Europe continues to absorb tin in the same ratio as has been the case up to the beginning of April, and general trade revives between now and the month of October without the interference of any political or financial occurrences of a disturbing nature, we believe that a 15 per cent. increase of consumption may be easily attained, absorbing 4275 tons in excess of 1874, when 28,500 tons were distributed, against 26,000 in 1873 and 27,000 in 1872. It should not be overlooked that trade in general has had to war against impediments of unusual magnitude since the commencement of 1874, and that under the circumstances the large consumption of tin has rather astonished the metal trade of the world. Mere speculative combinations seem to be inadequate to help the metal, and we shall have to rely on legitimate consumption alone, which now promises to continue liberal.

## The Law of Trade-Marks and their Analogues.

BY ROWLAND COX, ESQ.

III.

The preceding papers have afforded a measurably complete conception of what constitutes a legal trade-mark. We now proceed to inquire how title is acquired and how divested.

In England, to confer the exclusive right to a mark, it is essential that there shall have been a sufficient user to individualize it. That is to say, the mark must have been applied to a particular article for such a length of time that it has become known as indicating the goods of a particular producer. But in the United States title is acquired the moment the application is made. In the language of a text-writer, upon the subject, "apply the mark, and *eo instanti* it becomes the property of the person making use of it."

The acquisition of the right is free from difficulty; but when we come to consider the questions growing out of a divesture of ownership we encounter a number of embarrassing points. There can be no doubt that the proprietor of a trade-mark may abandon it by an actual dedication to the public, just as he may, ordinarily, assign or sell it to an individual. But there is as little doubt that the American cases, perhaps with the exception of a single instance, are to the effect that a protracted non-user, even with a knowledge of use by others, will not work an alienation. This doctrine, however, is directly antagonistic to that of the English courts, and cannot, it is thought, be regarded as more than a deduction resulting from judicial remark, rather than affirmative decision.

It is manifest that many words which were originally perfectly valid trade-marks have passed into designations of classes or kinds of goods. Thus the term "pig" was at one time a purely arbitrary word in connection with iron, a designation which some individual selected, and which, for an interval, was associated with his production of iron only. During this period it was a legal trade-mark; but others employed the word until by degrees it assumed its place as a part of the common language. Nearly every word which is employed to-day to signify a class or kind of goods was originally a perfectly valid trade-mark.

This notable fact is a demonstration in itself that a failure to prosecute infringements—for it is through infringements that a word or symbol comes to have a generic meaning—will, if sufficiently protracted, divest the right, however clear it may be. But to determine where the private right ends and the public right begins has never been undertaken by court or author further than above intimated. The only safe doctrine is substantially that of the English cases: that the question is to be measured by the principles and precedents that govern the abandonment of other rights of property. They cannot, it is true, be rigorously applied, but they lead to a conclusion that is at least free from dangerous probabilities. To permit infringement is the first step toward a loss of the right of property, and if the toleration of the infringement continue beyond a period in which the mark is generally imitated, *prima facie*, it has been abandoned.

It must not, however, be understood that a general rule can be laid down by which all cases may be measured. Every instance will be governed by its particular facts, from which alone a right conclusion can be arrived at. A mere non-user will be accounted of little consequence, and the same is true where imitations have existed despite *bona fide* efforts to prevent them; but there must be, under all circumstances, evidence upon which a court can base a judgment that there has not been a deliberate relinquishment of the right, either actual or constructive.

In respect of a sale of a trade-mark, a purchaser generally takes all the rights of his assignor. There are, however, instances where the right cannot be so assigned as to pass a valid title. Thus should the proprietors of the Wellington Mills assign to a producer of very inferior emory the right to use their celebrated mark, and the mark was used upon a worthless article, a court would refuse to record the constructive imposition upon the public by protecting what would be tantamount to a naked fraud. But here, too, the facts of each case must govern its solution.

The uncertainties of the common law, if such they may be termed, may be cured by registration under the act of Congress of July 8, 1870. This statute, while not by any means free from objectionable features, affords a means of defining and fixing the form of a trade mark, as well as other benefits. To register is to give notice to the world of the existence and nature of the registrant's right, and to establish a *prima facie* ownership. The provisions of the statute, too, in respect of jurisdiction, assignment, and other incidents, are of very great importance. While there must be a pre-existing right, the terms of the law, in some sense, create a privilege which is not enjoyed apart from them. Probably it is safe to state that by making registration a statutory right is acquired, which is practically perpetual. At any rate, there can be no doubt that every valuable mark should be registered, even if there may be room for question as to the exact effect of the law.

And the registration should be made in such a manner as to properly define the mark, neither adding to nor subtracting from its true nature. If there be any supplementary incidents combined with the primitive feature or features—the "characteristic trait or traits"—the registration will be productive often of very serious consequences. Where the owner of a mark deliberately records it, and files a description in which he notifies the public exactly where his right begins and ends, he will be held to the terms of his description. If he opens the way to infringement by a clumsy or indefinite specification, his registration will leave him in a very unfortunate attitude. But if he proceeds skillfully, and, stripping the mark of every superfluous element, reduces it to a naked, primitive symbol, or word, he greatly enhances the character of his claim and the means of protecting it.

The notion that a trade-mark may be patented is wholly erroneous. All that the statute permits is a registration, the putting on file, so to speak, of a claim, and its recognition for a period of thirty years, with the privilege of renewal.

It would serve no good purpose to enter into a technical discussion of the act of 1870. It will suffice to add that its benefits may be said to be very great where the registration is properly made, and that no American manufacturer can afford to ignore them. He will enjoy an exclusive right without taking advantage of them; but the reasons that move him to record the deed by virtue of which he holds his factory, apply, possibly with even greater force, in respect of that which typifies his reputation, acquired after years of enterprise and experiment. The recording of the trade-mark is really the same as the recording of the deed, no less and no more, except that the one confers upon the registrant incidental privileges which he would not otherwise enjoy, while the other leaves the pre-existing right unchanged in every particular. Both are purely precautionary, but both none the less of pronounced importance.

## William K. Nimick.

From Pittsburgh comes the intelligence of the death of Mr. W. K. Nimick, for many years prominently identified with the iron and steel interests of that city, and well known to the trade of the whole country.

Mr. Nimick was born in the First ward of Pittsburgh about half a century ago, and, as his parents were in humble circumstances, he had to make his own way in the world. His father kept a small grocery store, and maintained his family, three boys and four girls, as comfortably as his means would justify. The boys, however, could not find employment in the store, and early in life the deceased engaged as a clerk in the forwarding and commission house of Michael Allen & Co. He took to business naturally, and at twenty five was a member of the firm. At the death of Mr. Allen, when the business of the firm had become very extensive, William K. and Alexander, his brother, formed a partnership, and carried on the business with marked success. In addition to the forwarding and commission trade, they engaged largely in pig metal, and prospered in this likewise. With capital increasing upon their hands, the brothers embarked in manufacturing enterprises, and were members of the firm of Nimick & Co., pig metal dealers; of Singer, Nimick & Co., of the steel works; Phillips, Nimick & Co., Sligo Rolling Mill; and Jacobus & Nimick Manufacturing Company. Mr. Nimick was also one of the original stockholders of the Pittsburgh Trust Company, now the First National Bank, and up to the time of his death, and for many years, was a director of that institution. He was a prominent stockholder and director of the Allegheny Valley Railroad, and assisted Colonel William Phillips in the extension of that railroad to Oil City. Really, if it had not been for the aid and encouragement of the deceased, and the financial assistance rendered by him, Colonel Phillips would have never undertaken the completion of that enterprise. He put several hundred thousand dollars into Colonel Phillips's hand in behalf of that enterprise. The deceased was also a director in the Real Estate Bank, and a stockholder of other banks, insurance companies, and other moneyed institutions. The deceased, possessing a robust constitution, and being but little over fifty years of age, seemed likely to live to a ripe age; but a little over a year ago he was afflicted with jaundice, and ever since he had been growing worse, from a complication of diseases involving the vital organs, the liver, kidneys and heart. Since October last he has been confined to his house, and expired on Sunday, at midnight, calmly and peacefully, at the family residence, corner of Penn avenue and Fourth street. Mr. Nimick married a daughter of Francis Bailey, and had been a widower for eight or nine years. He leaves a family of three daughters and two sons. As a citizen, Mr. Nimick was enterprising, progressive and patriotic; as a business man, he was prompt, sagacious, upright and honorable, and in his social relations he was kind, genial, generous and devoted. He was beloved by family and friends, and respected and honored by all who knew him.

The following resolutions were adopted by the Chamber of Commerce:

The Chamber of Commerce of Pittsburgh have learned with profound regret of the death of Wm. K. Nimick, for many years so prominently and honorably connected with the growth and development of the business interests of this city. In all the relations of life he was known for his manly fidelity to every trust, and his unvarying courtesy to every one with whom he came in contact. His business career furnishes a conspicuous example to those beginning life of the highest success achieved by force and purity of character alone, and as an example of industry, sagacity and uprightness worthy of imitation.

It is, therefore, ordered that this tribute to his memory be entered at length upon the minutes of the Chamber of Commerce, and that a copy of the same be furnished to his family.

## Private Circular of the M. B. A.—How the Miners are Instructed.

The following secret circular, distributed among the miners of Schuylkill county, has just come to light, and is interesting as showing up some of the influences that are at work to keep the miners from going to work:

PRIVATE.

It is hoped this circular will not be shown outside of the union.

POTTSVILLE, April 10, 1875.—To the M. and L. B. A. of Schuylkill county—Brothers: I have received telegraphic information that the miners of Hyde Park have refused to suspend, though they are prepared to divide their work with union men coming from Schuylkill and the other regions that are out. This being the case, it seems to me that the time has arrived when a change of our programme is necessary.

At the beginning of the year it was decided that no union man should do mining work of any kind (pumping alone excepted) for any operator but those who would sign an agreement to pay 1874 basis for the year. The fact that under that rule the Union has grown in numerical strength to much more formidable proportions than ever before, and the fact that it has put operators hard to for coal, besides, notwithstanding the suspension has not been general, almost completely depleting the market, proves that the decision was a wise one, but now circumstances attending the trade are vastly different from what they were in January last. There is now a demand for coal that, beyond any doubt, guarantees the payment of 1874 basis. *Many of the individual operators' collieries are in such a condition that, if work does not proceed in them in a very short time, they will be unable to ship any coal this year*, beside our own people, in many localities where work was scarce last year, are becoming poor, and while I believe all are willing and able to hold out at least two months longer, if necessary, it is the best policy for us to get them as soon as we can do so without sacrificing our honor or our union. In view of these facts, I urgently recommend that a meeting be held in each district immediately, and that a vote be taken on the following propositions:

First. That the demand for the $2·75 and $3 basis be withdrawn, on the ground that we are willing to make that much of a concession to the professed necessities of our operators, and that the demand is not a general one throughout all the regions.

Second. That the members of the union shall return to work for whatever will pay the basis, regardless of whether it be signed for the year or not, but that no coal be shipped from the collieries of the Philadelphia and Reading Coal and Iron Company until such time as a final settlement has been made by the committees of the Coal Exchange and the M. & L. B. A. This resolution will allow dead work to be done for the C. & I. Co.

I have carefully considered the probable effect of your agreeing to these propositions, and I confidently believe that it will be good. Mr. Gowen may be stubborn, and I have been told by those operators who are in the Coal Exchange, will not take advantage of the offer for fear of not getting cars, but there are some who assert if they could go to work without signing the basis of the year, they would willingly do so, and pay 1874 prices, and should there be any considerable number do this, then the chances are that all will follow suit in a very short time, for but few of them would long rest contentedly idle when others were working and making money.

However, in your wisdom, if you think it would not be safe to indorse the foregoing proposition, I would suggest that some means be devised for sending a number of our people to places where mining is now being done, and that as much money as can be had, and which is not absolutely needed to buy bread for the poorest, be devoted to helping those who are willing to go away, but have not the money to take them. It would be much better to do this, even if we are compelled to go to Luzerne, and other like places, where, though wages have been reduced, the reduction is not so great as that proposed to us. A certain amount of coal must be shipped to supply the market, and we must cut it. Is it not good policy for us to go to cut it where the reduction is the least?

A meeting of the Executive Board is hereby called to convene at Pottsville on Thursday, April 22, when it is hoped every delegate will come prepared to cast the vote of his district as to which, if either, of these propositions shall be agreed upon.

In conclusion, as I shall be away from home until Saturday next, permit me to express a hope that no member of the Association will allow himself to be dispirited by the conclusion which the Hyde Park men have come to. If they were out it would be a much easier contest for us to fight; but there are not so many of them working, after all, and the quantity of coal they are sending to market is not sufficient to beat us, if we are determined. Whatever is done from this out must be done cautiously. We must maintain a bold front; we must not permit ourselves to be frightened or cajoled, but we must be prepared to take advantage of all the chances. If, by returning to work for operators who will pay the basis, but will not sign for the year, or if, by sending a goodly portion of our men elsewhere to work, we can win, let us do one or the other of these things; but if neither of them seem to you good policy, vote them both down. I only ask you to believe that, in making my recommendation, I am actuated by a desire to bring the good ship of union safely into the port of victory, and by no other motive. [Signed]

JOHN F. WALSH, President.

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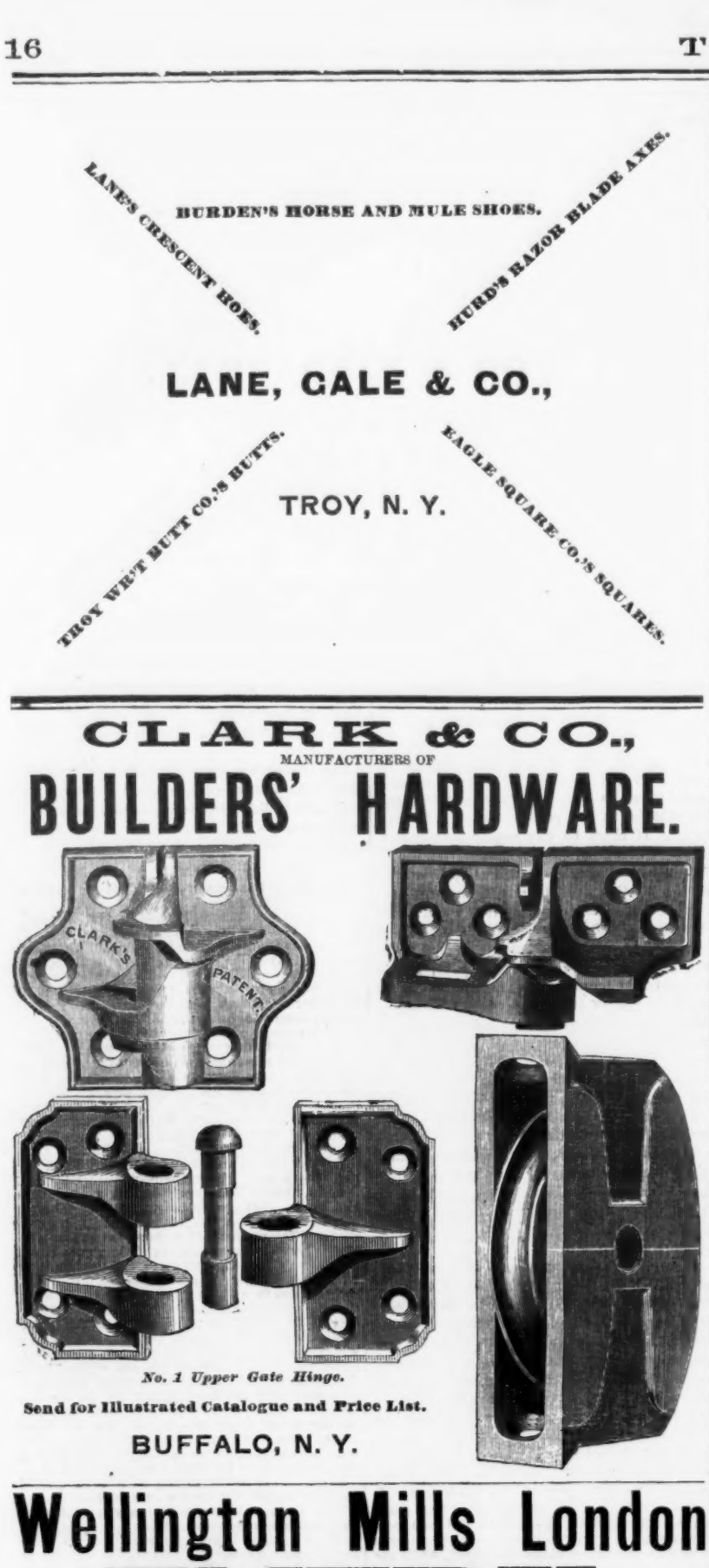


*No. 1 Upper Gate Hinge.*

Send for Illustrated Catalogue and Price List.

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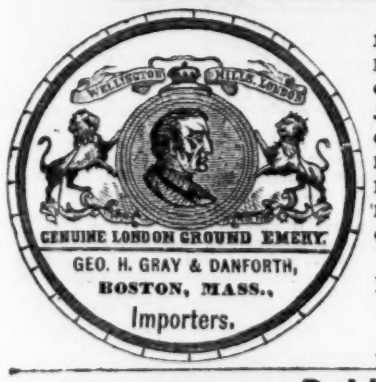


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## O. H. HICKS & CO.

Manufacturers of the

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## DUNBAR, HOBART & WHIDDEN,

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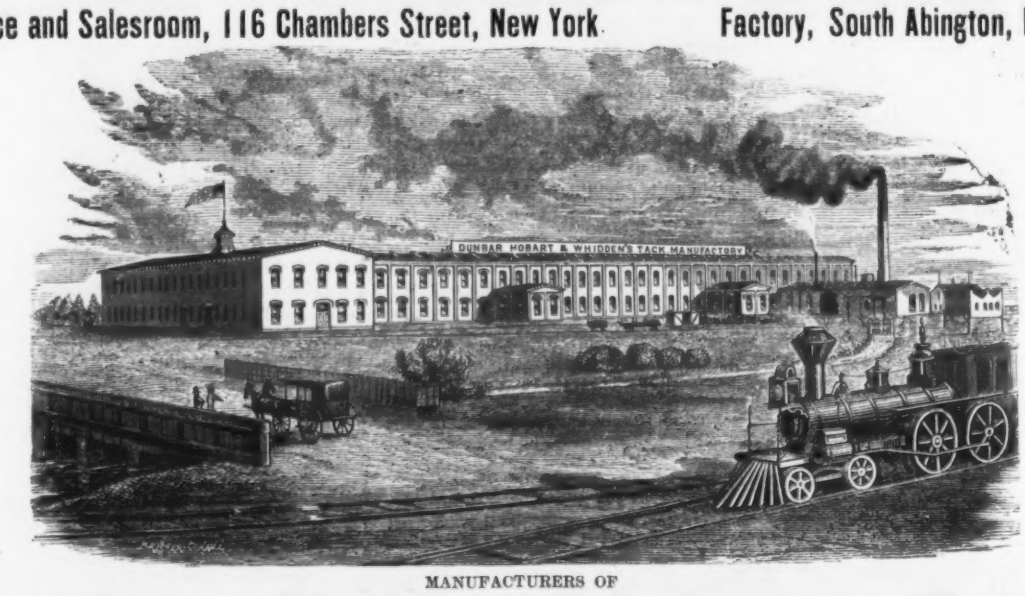
Office and Salesroom, 116 Chambers Street, New York. Factory, South Abington, Mass.

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**Tinned, Leathered and Large Head Carpet Tacks, Finishing Nails, Black and Tinned Trunk Nails, Miners', Gimp, Lace and Brush Tacks, Hungarian, Chair, Cigar Box and Barrel Nails, Glaziers' Points,**

IRON, STEEL, COPPER, ZINC AND BRASS SHOE NAILS,

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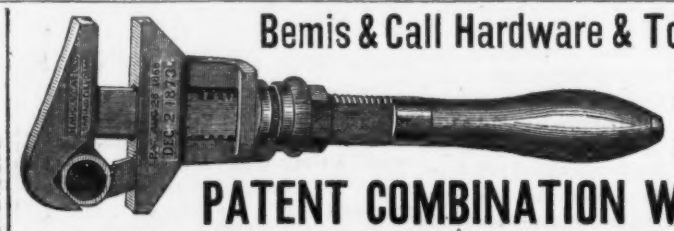


This Wrench can be furnished with Briggs' Pat. Nut or Sleeve.

## PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, Case-Hardened throughout, and not only combine all of the superior qualities of our cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench, thus making a Combination which has no equal.

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MECHANICS' AND MACHINIST TOOLS,

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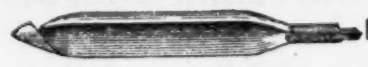
Slaters' and Coach Makers' Tools.



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## NEW MODEL DERINGER REVOLVER.

**22 Cal. 7 Shot.**

An exact model of S. & W. No. 1 Revolver.

This arm is Half Nickel Plated, and is equal in style of finish to the best arms in the country. Quality of workmanship and material first-class, and guaranteed in every respect.

**Price less than any other Hinge Barrel Cartridge Revolver in the market.**

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Made in Oroide and German Silver, plain or embossed fancy patterns, with
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# Stearns' Pat. Expansive Fore Auger.

A new invention for trimming down a spoke before using the Hollow Auger, effecting a saving of one half the labor, by the knife cutting at an angle more with the grain of the spoke, than the Hollow Auger.

It is particularly adapted to heavy work, cutting any size up to inch and a half.

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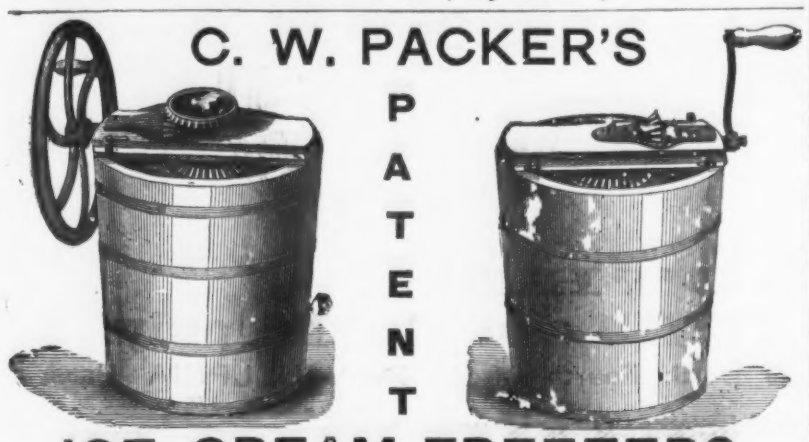

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| 10 quarts | | | $15·00 |
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| 2 quarts | | 8 quarts | $ 9·00 |
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For sale in New York at minimum rates by Wholesale Dealers in House Furnishing Goods generally.

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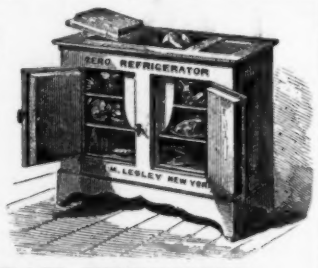


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**Pot Plant and Garden Trellises,**
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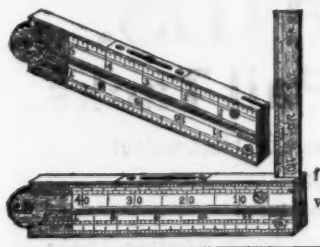
Also Exclusive Manufacturers of



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**Riverton, - - - - Conn.**

Boxwood and Ivory Rules having been our specialty for over twenty years, we guarantee the uniform excellence which has always characterized our goods.

Price Lists on application.

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Sole Manufacturers and Patentees of various Patented Improvements, including Gig Trees, "Imitation Covered Mountings," Wedge Buckles, &c., &c.

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Ladies' Belt Buckles,

SLIDES, DOOR ROSES, ESCUTCHEONS, BAG TRIMMINGS,

and all kinds of small

BRASS GOODS.

Special attention given to new articles, and estimates furnished.

Factory,

34 and 36 Eagle Street, Newark, N. J.

Offices,

62 Duane Street, New York.
245 South 5th Street, Phila.


## A Venerable Mechanic—Thos. Cooper, of Cincinnati.

A friend in Cincinnati sends us the following sketch of a venerable mechanic, Mr. Thos. Cooper, which is of great interest as showing the amount of continuous labor which one man can perform:

Thomas Cooper, the subject of this sketch, was born on Christmas day, 1816, in the town of Bilston, in the county of Staffordshire, England. Owing to his parents being in humble circumstances he received no school education. In 1824 he went to work in a rolling mill in his native town, and from that time to 1830 he worked in three rolling mills in the neighborhood. In that year his mother died, he being then 13 years of age. Soon after her death he went to Birmingham and worked in an iron and steel rolling mill, owned by the Messrs. Bosley. There he got acquainted with a man who had three brothers that had worked in the Ulster Iron Works, on the River Hudson. Business being dull in Birmingham, he was induced to emigrate to this country, being assured of employment on his arrival here, owing to a communication having reached England from the man who had worked at the Ulster Mill, stating that the mill was standing still for want of competent hands, and if some could be induced to come here, they would get good wages. Arrangements were soon made for him and three other young men who were smart lads, and their passage was paid from Birmingham to Liverpool, and from Liverpool to the United States, in the sailing vessel Roscoe. This was in the year 1835. Thomas was nearly 19 years old. The lads were met in New York on their arrival by a son of the proprietor of the iron works, who took them to the Barclay Hotel, and thence to the works. This was a rolling mill, and employed about 100 hands, but the proprietor wanted men to roll light, small iron—¼ inch and ⅝ inch hoop, and iron of that description—and they could not be obtained at that time in the United States, for there were few that thoroughly understood the work. Thomas worked at this establishment eight months, and then went to Stamford, Conn. There he worked eight months in a rolling mill. Thence he went to Haverstraw, N. Y., and worked there twenty months in a rolling mill. Being inclined himself to roll, he went to Pittsburgh and worked in a rolling mill near Saw Mill Run, on the western side of the Monongahela, the river that divides Pittsburgh from Birmingham. The proprietors of the mill were Lawrence & Cuddy, one of the partners having been the proprietor of a mill in which he had worked in England, who resigned his situation as head roller to Cooper. During the seven years that he stayed there he saved money and built a house that cost him $4000. Tired of a bachelor's life, he got married, which made him anxious to get into business for himself. He went to Franklin, Pa., which is situated at the mouth of French Creek, and with six partners he built a rolling mill there, and carried on business for two years and a half, under the firm name of Nock, Dangerfield & Co. A disagreement occurred among the partners, and when a final settlement occurred between them, prior to his leaving Franklin, he found that he had been working all this time—two and a half years—for nothing.

He returned to Pittsburgh, obtained a situation in the mill of Miltenburger & Brown, and rolled for them about three months, when he returned to his old employers, Lawrence & Cuddy, with whom he remained about six months. He resigned his situation and went to Youngstown, O., where he built the first rolling mill ever erected in that town. It was what is called in the trade a 10 inch mill. Here he lost two or three months, receiving no remuneration for his labor. From Youngstown he went to Wheeling, West Va., where he was warmly welcomed, because he was competent to roll the iron for the suspension bridge that was then being erected across the Ohio. During the two years that he worked in the rolling mill of Shoenberger & Stevens, of that city, he made about $100 a week, and accumulated about $4000. At this time he considered himself worth about $8000, as he still owned his house, which he had built in Pittsburgh. With this capital he built, in conjunction with a Mr. Harris, a small rolling mill in South Wheeling, which was known as the Washington Rolling Mill, and did business under the firm of Cooper & Harris. During the three and a half years that he carried on this business he was chosen a member of the first Common Council elected in South Wheeling.

Unfortunately for him, he mortgaged his house in Pittsburgh for $3000 worth of iron, in order to carry on the mill. The mortgage was subsequently foreclosed, and he lost his house. The partners at length quarrelled, and they dissolved partnership, the mill being sold for $23,000. The company that purchased the mill turned it into a rail mill, and Cooper took stock in it as part of his share of the purchase money.

At this time an old friend introduced him to James Rogers, and in partnership with him and some others, Cooper built a rolling mill at Ironton, O., putting in $3500 worth of machinery that he had taken out of the mill at South Wheeling. It was called the Lawrence Rolling Mill, and the name of the firm was James Rogers & Co. He superintended the erection of the building, and took charge of the rolling department. At the end of two and a half years, foreseeing that the firm must ultimately fail, he withdrew from the concern and went to Pomeroy to turn rolls, and was so employed there for about three months. He was afterward engaged as manager of the Pomeroy Rolling Mills, which situation he held for one year. When the Ironton mill sold out, after a lapse of seven years, it was discovered that Cooper was a partner, and it had to be sold over again. Litigation followed, but at length he obtained as his share of the proceeds $1800, but the costs were heavy, so that he only realized one-half, or $900. From Pomeroy he went to Cincinnati, and was engaged for two years in the Globe Rolling Mill.

He then invested everything he had in the world in the Cooper Axle and Shafting Mill, which he invented and patented. He has spent $4000 on it, in the models, patents, advertising, &c. He patented it in England, and expected to realize a fortune from it, but owing to a combination of unfortunate circumstances, which were beyond his control, to-day he is financially wrecked, but his buoyant spirits prevent him from repining. The mill which he patented is designed, principally, to make axles for railroad cars, but beside these it will make all kinds of shafting, &c. It will complete from 25 to 30 axles per hour.

Such is a brief history of Thomas Cooper, the "rolling mill man," as he likes to be called, now a resident of Cincinnati. He is in his 60th year, and has probably rolled more iron than any other man in America, and done more than the share of one man in the performance of the arduous labor incident to a life in a rolling mill. He is a plain, blunt, honest man, about 5 ft. 7 in. in hight, is never to be seen without a broad smile on his wide-cut English mouth, has a large, round face, a laughing but expressive eye, is powerfully built, and may yet live for many years, but has performed all the labor he will be able to do in a rolling mill.

## The Resumption at Pittsburgh.

The *American Manufacturer* says of the recent abandonment of the lock out in that city:

The immediate occasion of its termination was the firing up of the furnaces at Painters' on Tuesday evening, the 13th. The following afternoon the Pittsburgh manufacturers held a meeting and decided to resume. It is understood that a large number of the firms represented were in favor of continuing the lockout, but others, who had some orders, were desirous of starting, and it was thought best to remove the restrictions and wait for a more convenient season.

Most of the mills in resuming have signed an agreement which is virtually the old agreement or scale of prices which was in effect before the lock-out, but with the scale extended to 2½ cents, card. There is this important difference, however: the old scale was signed by committees representing the manufacturers and the boilers' union, this new agreement is between each individual manufacturer and his employees, and so far as the union is concerned it is not recognized. This is a point of no little importance to the manufacturers, and in its effect will probably have a deeper meaning than the union was aware of. The agreement provides that either party desiring to terminate it shall give the other 30 day's notice. Though a number of the manufacturers have signed this, others have not, and are now working without any agreement except a verbal one to pay the same price that the others do.

There is another element of trouble that has not yet been settled, and which has as yet prevented several mills from starting. That is the status of those who worked at $4·50 during the continuance of the lock out. The boilers who formerly worked at these mills demand their discharge as a pre-requisite to their return to work. They do not put it in these words, as they dare not. The demand is in the form that every man who went out shall have his furnace back. The mills refuse this and will continue so to do; as we state in another place, the result is that a number of puddling furnaces are still idle. For this and other causes more than 200 furnaces are not in operation, and about 50 of those that are at work are operated by boilers who had no connection with the strike. So it is seen that the resumption of work is by no means as general as it has been represented.

We do not by any means regard this contest as ended. It will be resumed at no very distant day, that is if the iron trade continues in its present depressed condition, and we imagine when it comes on again it will not be Pittsburgh's fight alone. The boilers have made a union of employers possible.

## Resumption at the Missouri Furnaces.

A correspondent of the St. Louis *Railway Review* says:

The air for some weeks has been laden with the first feverish signs of activity, the forerunners of the sturdy strides of progress this giant city of industries is now making. The past year, although one of general prostrations and disaster to industrial pursuits, still shows an increased production of manufactures of nearly $30,000,000 in St. Louis. This season presents the extraordinary increase thus far of over 76 per cent. in the amount of fuel received, a proof of the healthy growth of the city, and at the same time of the revival of activity at our mills and furnaces.

During the past year the furnaces at South St. Louis, some eight or ten in number, have remained out of blast, or in one or two cases, been "banked up" for the greater portion of that period. A number of charcoal furnaces have continued production in various parts of the State, among which were the "Irondale, Iron Mountain and Pilot Knob" on the Iron Mountain Railroad; the "Scotia," "Hamilton," "Ozark," "Mozelle," "Meramac" on the Atlantic and Pacific Railroad; the total weekly production of which would average about 1000 tons. At the present time there is in St. Louis only about 5000 tons of charcoal iron made from Meramac ores unsold, and nearly all the furnaces now running are working on orders ahead, at about present quotations, but with no immediate prospective improvement in the price of iron. This fact is explained by the decreased cost of product on at all our furnaces, brought about by careful supervision of working results and in the reduction of the price of ore. So it will readily be seen that while prices may not advance, and even may be slightly less than at the present time, still, with the magnificent resources of Missouri, and the extraordinary percentage yielded by her iron ores, this State may largely increase the production of iron without overstocking the market, and at the low price at which iron can be made, become a formidable competitor of Pennsylvania.

The Missouri Iron Company's furnaces were lighted up on Wednesday, the 14th, and the South St. Louis Iron Company's on the 9th inst. The latter have orders ahead for 5000 tons for Bessemer purposes, and the former go to work on orders for several thousand tons, so it is reported. The Vulcan Works will not go into blast, as recently reported, nor the new Jupiter Works, for some time to come. The Meier Iron Works are nearly completed, but it will be some time before they will be blown in.

At the Vulcan Rolling Mills the No. 1 and 2 mills are running on light and heavy rails, and arrangements have been finally perfected for the addition of a Bessemer plant of the most perfect design, costing $225,000 more, making these the largest works with, perhaps, one exception, on the continent.

The St. Louis Bolt and Iron Company is running double turn on street and mine rails, fish bars, &c., with orders ahead.

The Helmbacher Forge and Rolling Mills started up about the middle of March, and are running on merchant bar iron and forging. They also make an excellent mine rail, weighing from 12 to 25 pounds to the yard. They employ at present about 160 men, and have a full capacity equal to 18 tons of bar iron and 20 tons of car axles and forging per day. The Laclede Rolling Mills are in active operation, and have lost only four days since September last. The capacity of the works is about 10,000 tons per annum. They make all kinds of bar iron, sheet, plate, angle and sash iron; also boat spikes, railroad spikes, street and tram rails, T rails, bridge iron, fish bars and bolts, &c. They are now employing about 300 men, and are running the bar and sheet mill on fresh bars, plate, &c., and are filling a large order for Franklin avenue street rail line. They report orders and trade fairly active.

The Harrison Wire Works are running full force on over time, and have had a large demand from the trade. Nearly all the stove works, foundries, agricultural works, machine and engine works are doing a good degree of business, and we look forward to a gratifying increase over the previous season in all branches of the iron trade of St. Louis.

## The Centennial Exhibition.

The annual meeting of the Centennial Board of Finance was held in Philadelphia on Thursday. The *Ledger* gives an account of their transactions, which we condense in the following: Thirty-one foreign governments, including nearly all the civilized nations of the world, have accepted the invitation to participate. The permanent or memorial building, 365 by 210 feet, to be used as an art gallery, was begun on the 4th of July last, and is now in a forward state. The main Exhibition building, 1880 feet in length by 464 feet in breadth, covering more than twenty acres, begun at the same time, has all the foundations laid for its 672 piers, and the iron framework and the glass-work and all other portions of the building have been in rapid course of manufacture in the iron mills and glass furnaces ever since, and are all in an advanced condition of progress. The time for their completion is Jan. 1, 1876, and there is no doubt they will be finished by that time. The contract price for the first building is $1,199,273, and for the second $1,420,000, exclusive of drainage, plumbing, &c., and decoration.

For the exhibition of machinery there is another building, "Machinery Hall," 1402 feet by 360, with an annexe 208 by 210 feet, covering fourteen acres of floor space, and this is being pushed forward rapidly. It is to be ready Oct. 1, 1875, and the contract price is $542,300. The horticultural building (a very beautiful design), is being constructed, to be delivered Sept. 1, 1875. It is 383 by 193 feet, and the contract price is $253,937. The agricultural building, which is to be 820 feet by 540, with a floor space of ten acres, will be ready for contract within two weeks, so as to insure its erection by the 1st of September next. The cattle and stock inclosures are outside of this. Around the Exhibition grounds, which include 236 acres of the park, there will be a fence over 16,000 feet in length (something over three miles), and the walks and roads will have a total length of seven miles. Ample provision has been made for thorough drainage, and full supplies of water and gas, and means of access from building to building.

The report of the directors refers to the important subject of finance. They still need three and a half millions for the completion of the work to the end. The directors express the strongest confidence that all the money required will be forthcoming. The patriotic centennial celebrations in which the country is now engaged, such as those of Lexington, Concord, Mecklenburg, Bunker Hill, our own Westmoreland county, and others, are already having the effect of augmenting contribution, to the fund, and this is now expected to go on in increasing rapidity and amount during the year. And, apropos to this, the report contains a gentle reminder that, notwithstanding the large contributions and subscriptions made by Philadelphia, there are still many of our citizens and several large classes of business interests in the city who have not yet come forward with their aid. The report contains a handsome and just acknowledgment of the valuable service done by the Women's Centennial Committee.

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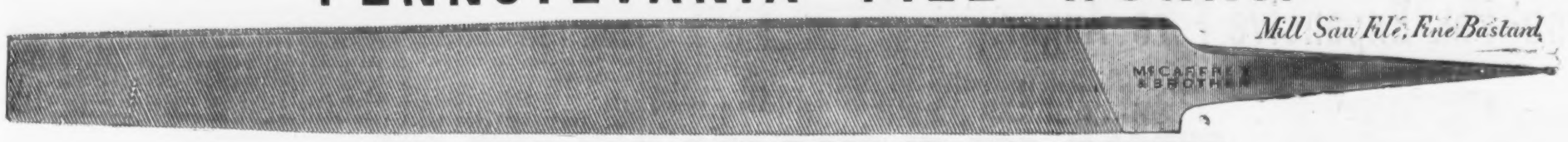


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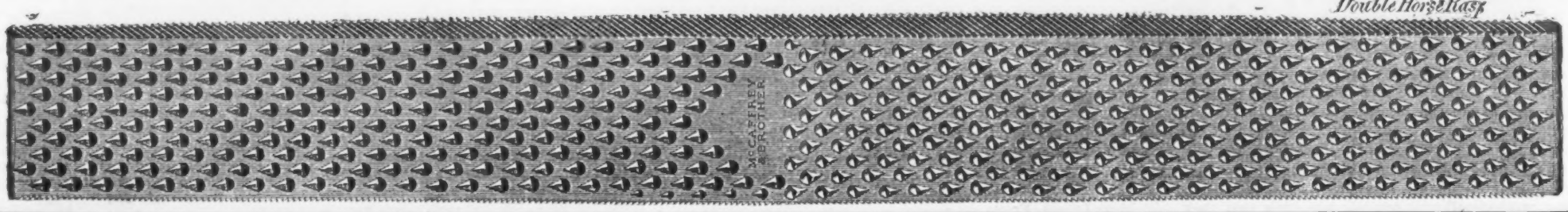


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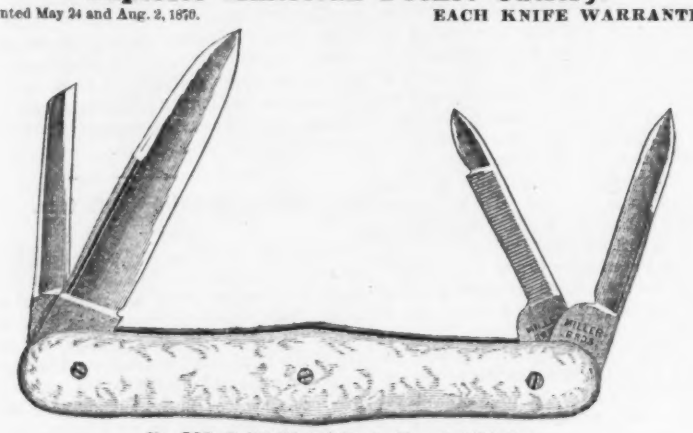

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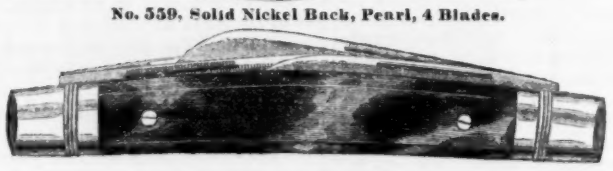

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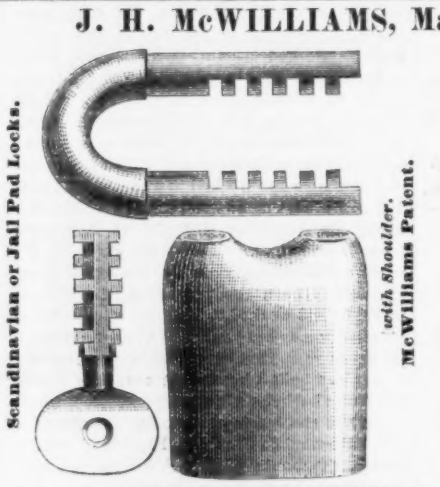


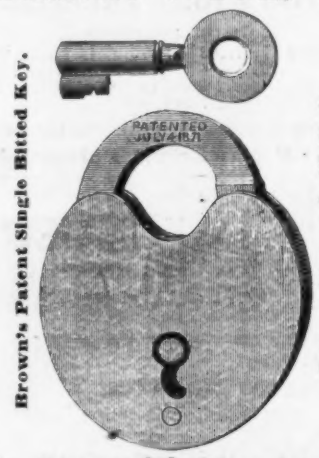

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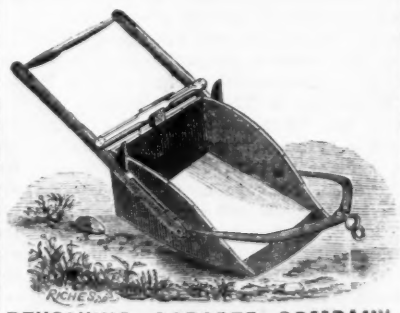

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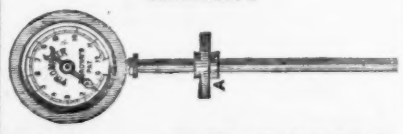

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### Deadening Metal.

When a wire, by which a weight is suspended, is made to swing about by torsion, the amplitude of swing, it is known, ever diminishes; the successive amplitudes form, according to Gauss and Weber's observations, a converging geometrical series, and the natural logarithm of the exponent of this series is called the *logarithmic decrement* of the arc of oscillation. We understand by the deadening of the swings, or oscillations, the phenomenon of their ever growing less. The cause of this deadening is partly in the resistance which the air opposes to the motion, but partly also in the wire itself, the distortion of which also presents resistance to the motion.

This phenomenon of internal deadening (*Damfung*) of the metal has formed the subject of a recent investigation by M. Heinrich Streintz, described by him to the Vienna Academy. He studied, in various experiments (which we do not stop to detail), the connection of this deadening with the temperature, with the amplitudes of the torsional swing, with the tension of the wire, with the moment of inertia of the suspended weight, with the diameter and length of the wire, with the annealing of the wire, and with an exceeding of the limit of elasticity. We will here merely give a short statement of his results, and proceed to some practical applications which he makes of them.

The logarithmic decrement, he finds, is independent of the width of swing, also of the tension of the wire; also of the duration of swing, if the change of this is caused by a change in the moment of inertia; finally, it is independent of the length and the diameter of the wire, if the turning moment (*Drehmoment*) changes correspondingly to the change of length. On the other hand, the logarithmic decrement is different for different metals, and also very different for one and the same metal, according as the wire is unannealed or annealed. It is greater in the former case than in the latter. Further, the logarithmic decrement is less the more oscillations the wire has already made, and it approximates, in this decrease, to a certain limit. This phenomenon the author denotes as the accommodation of the wires. Lastly, the decrement is much greater with higher temperatures than with lower, so that temperature has been considered as the only cause of deadening.

It will appear from this that the resistance which wires oppose to torsion within the limits of elasticity is less the oftener such torsions are produced, or (as the property is denoted), the wire "accommodates" itself to torsions. The same decrease of resistance is observed where the wire has been annealed. Now, a newly-drawn wire is denser, it is known, than an annealed one; the molecules in the former are nearer each other, and are in a state of reciprocal tension, and so they must present a greater resistance to displacement.

When a newly-drawn wire is heated, the reciprocal tension is still further increased; as we find indicated by the fact that the deadening becomes greater, and, at the same time, in consequence of this tension, an actual pushing asunder of the molecules takes place. If the wire is then allowed slowly to cool, the molecules go together again, but no longer in the way corresponding to their natural state of equilibrium—they do not now go into their earlier condition of tension; and we obtain a wire, consequently, in which the internal friction is less. Now, as through frequent turnings, within the limits of elasticity, the wire becomes softer for such turnings, the same occurs in other changes of form.

It is known that steel pens become softer through use, which involves continual slight changes of form within the limits of elasticity. A similar thing occurs in the seats of iron chairs, formed with tips of wrought iron or steel. They lose their hardness through use, and are ultimately bent.

Accommodation plays an important part in musical instruments. It is a well-known fact that trumpets, before they can be employed in public performances, must first be blown in, or used, for a considerable time, in order to develop their full tone-action, and make them capable of being easily blown. In fact, the deadening has first to be lessened for the tone vibrations (or the resistance of the metal to these); and this is effected by putting the metal frequently in vibration. A trumpet may also be blown out of tune. If, when quite new, it comes into the hands of an inexperienced performer, who often blows certain false notes, the trumpet is blown out of tune. That is to say, the deadening decreases for these particular tones, so that the trumpet is more easily thrown into these vibrations, than into others, which are not so often excited; and it becomes, therefore, very difficult for even a practiced performer, to avoid these false tones. It would in this case be of no use to diminish the deadening of the trumpet metal by a temporary heating, for this process would affect all the tones similarly; only correct blowing will bring about the desired result.

A similar experience is had with stringed instruments. In these, it is not the strings that require long playing, for their resistance to the vibratory motion is (owing to the smallness of the mass to be moved) unimportant; but the resonance ceases. However excellent the construction of the latter, a long continuance of good playing is indispensable for them. This is accounted for by the fact, that the good player awakens a stronger tone, and so, vibrations of greater amplitude; hence, also, for these, the deadening is diminished. Further, he excites only a certain kind of overtones, which determine the "clang color," and for these overtones the deadening is diminished. Through long rest without use the advantages of this playing out are again lost, as the accommodation also partly disappears through rest. That pianos do not also grow better after long use is due to the fact that the mechanism of the piano wears out.

The circumstance that, with increasing temperature, the deadening grows so very quickly, may perhaps serve somewhat to explain the process of hardening of steel. The soft steel is heated, and thereby the molecules are brought into a state of greater internal friction. If now, the hot steel is quickly cooled, the molecules have not time to part with this condition of greater internal friction; it still remains, in part, in the cold state, and we have then a hard steel. The steel, it is known, is harder the quicker the cooling occurs. The resistance of the molecules of hard steel to magnetization, and the great magnetic residuum, witness also to the greater internal friction of its molecules.

A technical application may be found for the determination of the logarithmic decrement; for, inasmuch as this depends in great measure on the hardness of the metal, its determination may serve in investigating the homogeneity of the hardening.

### Pumping Engines.

At the last meeting of the North Staffordshire Institute of Mining Engineers, Mr. Woodworth, of Longton, read a paper on recent improvements in pumping engines for mines.

In the course of his reading he remarked that in designing steam machinery of all kinds, the great questions to be borne in mind were economy of fuel, of maintenance, and of construction. The importance of economy of fuel was manifest when they considered that the steam engines in this country alone consumed nearly forty million tons of fuel per annum, so that a small percentage of saving, by whatever means obtained, represented a considerable addition to the national wealth. While the cost of coal in Cornwall had been a subject of vital importance ever since the steam engine was introduced, it was not to be wondered at that the earliest steps were taken to secure as great an advantage as possible by the economical use of steam in draining the mines, although they found that the duty of the engines in that district had receded considerably for the last twenty years or so, as the rage for extreme limits of expansive working had been carried so far that the cost of maintenance and risk of accidents were so great as to more than counterbalance the benefits derived from an extreme range of expansive working. The Cornish engine in itself was a very costly machine in the first case, being only a simple acting engine, and lifting a constant load compelled it to have a great weight of matter to put in motion quickly during the first portion of the stroke if worked expansively, so that sufficient energy could be stored up to enable it to complete its stroke after the steam was cut off at the point desired, and then the water was lifted steadily on the outward stroke by the action of gravity alone; while the differential pumping engine could be fixed either at the bottom of the pit, dispensing with the cumbrous rods entirely, or on the surface, as desired, and working double-acting, was nothing like so costly, either in engines or buildings, for the same power, and such was the absolute safety of the action of the valve gear, that the load might be entirely thrown off when the engine was in full work, with the stop valve wide open with impunity. For the draining of dip workings the late Messrs. Garrett, Marshall & Co. designed the direct acting hydraulic engine and pump to be worked from the main column of pumps, or anywhere where sufficient water pressure was available, and there was a wide field for its application in all districts where there was a head pressure of water, which was often to be had at a nominal cost. The differential engine had been in operation for some years, and had been fixed in a number of collieries, the highest lift at present being at Clay Cross, where they were working against 1000 feet head of water; and some very large ones were being made for Germany, to pump against 900 feet head of water, with hydraulic engines to pump for a short distance below, to avoid all risk of the engines being flooded through any cause, as the hydraulic engines would continue working equally as well under water as above. Attention was called to the engine designed by Mr. H. Davey, of Leeds, and for which many advantages were claimed.

### A Birmingham "Strong Room" for the East.

Mr. J. Felton Elwell, of the "Sicker" Safe Works, Birmingham, has just completed a fire and burglar proof strong room for the treasury of an Eastern government, and a brief description of it will no doubt be interesting to our readers. It is to all intents and purposes a "strong room," being entirely constructed of wrought iron and steel. Its dimensions are 7 ft. high, 7 ft. long, and 6 ft. wide, and is panelled on every side with ornamental beaded iron. The outer plates are half an inch thick, rebated, and united at the angles by alternate screws and conical rivets on to 3 in. angle iron half an inch thick, and inside these there is an air chamber 1½ in. deep, on every side of the room, succeeded by the iron chambers containing the fire-proofing. The latter are 3½ in. deep, and contain nearly 7 cwt. of the most approved chemical steam generating compound, calculated to preserve the contents of the strong room intact, although the exterior may be surrounded with fire for twelve days. The thickness of the "walls" of the room is thus nearly 6 inches, and are so constructed, and the joints and doors fitted with such accuracy, that the room is not only fire-proof, but watertight, thereby protecting the contents not only from fire, but from damage by the water employed in extinguishing it. The room is fitted with double or folding doors, each composed of two plates ½ inch thick, with an intersection of drill-proof steel ¼ inch thick, hardened by a chemical process invented by Mr. Elwell. This renders the doors absolutely safe from the burglar's drill, for the application of a powerful steam drilling-machine to a plate of the steel leaves only a bright smear on the surface of the plate, but instantly destroys the drill. By a turn of the handle in the doors, twenty one steel bolts are thrown simultaneously into sockets all round the frame, and these are secured by one of the "Sicker duplex," or double secure locks, while the keyhole is locked over by a drill-proof steel plate. The interior of the room is fitted, right and left, with a series of shelves and partitions, twenty four in number. At the back there are twelve safes, the lock of each being different, and, notwithstanding these fittings, there is room enough for at least twelve men to stand in the room when the doors are closed. The weight of the whole structure is nearly seven tons, and as so large a body could not be conveyed abroad whole, the difficulty has been met by constructing the room to take to pieces, and to form seven packages. By the exercise of much mechanical ingenuity, the whole of the fastenings are worked, and are only accessible from the inside and are not traceable on the outside of the room. So neatly and obscurely arranged are these fastenings that unless they were pointed out and explained it would be difficult to detect that the room was capable of separation without being entirely destroyed; it can, however, be taken to pieces and reunited as readily as an iron bedstead.

### The Wrongs of American Boys.

The Chicago *Tribune* says:

The wrongs of women and negroes have monopolized public attention for many years. Serious as some of them are, or have been, the wrongs of boys are as bad, if not worse. For a series of years the boys of America have been shut out, more and more completely with each year's advance, from the chance of learning a trade. The trade unions, with almost incredible blindness, have adopted rules which prevent the employment of any except a very limited number of apprentices. These rules forbid a master to employ an apprentice unless he employs a certain number of journeymen. In some trades, the proportion is one boy to twenty men. The few places left vacant by apprentices becoming journeymen are soon filled. Tens of thousands of boys are thus deprived of the opportunity to become reputable and self-supporting artisans. When they leave school and try to do something for themselves they find the doors shut in their faces. Instead of becoming blacksmiths, silversmiths, carpenters, compositors, cabinetmakers, coachmakers, hatters, machinists, bakers, tanners, tinners, tailors, masons, shoemakers, stonecutters, plasterers, bricklayers, weavers, they have to become bootblacks, newsboys, errand boys, beggars, loafers, dead-beats, paupers, thieves, etc. No one of the occupations open to them offers any education, except in a sort of a cunning which is often a curse. If the members of the so-called liberal professions, the journalists, lawyers, teachers, doctors, and ministers, should successfully combine to prevent the education of boys and young men in any of their specialties there would be a universal howl of complaint. A far greater wrong is committed, however, when trade education is prevented. Many more boys are affected, for one thing, and most of them must go to work at once and labor constantly in order to live. If they do not do this and do not steal, they must starve.

**Captain Ead's Jetty System.**—The St. Louis *Republican* describes the details of this work as follows: The first thing is to cut the twigs. They are then bound into bundles, called in engineering parlance "fascines." These fascines are, say eight or ten feet in length and as many inches in diameter, though of course their size is varied at the convenience of the workmen and according to the requirements of the work. Having been cut and properly secured the fascines are put together in the form of a raft. Like timber logs, towed to the required spot, and then loaded with stones until they sink to the bottom. This process is repeated with successive rafts until a continuous foundation is laid the entire length of the proposed line of jetties. The first or foundation rafts will be from 75 to 200 feet in width, according to the depth of water where they are sunk, the deepest water requiring the widest rafts. As soon as the foundation is completed in this manner, another line of willow rafts is sunk on top of those already down, and so on until the surface of the water is reached, each line of rafts being narrower than the one below it, until the topmost line will not be more than ten feet across. By this means a channel is created with sloping sides. The water gradually fills up the interstices between the twigs with sand and sediment, and in the course of a few years the structure becomes as solid as a wall, being, in fact, a submarine levee. It will readily be seen that an almost incalculable quantity of willow twigs will be required to construct these two long lines of jetties the whole length of the South Pass, and the work of cutting and preparing them will furnish employment to a great many men.

In the twelve years immediately preceding the completion of the drainage and water supply system of Salisbury, England, the yearly mortality amounted to 27 per 1000. During the twelve years following the mortality fell to 20 per 1000, and during the last three years it was only 17 per 1000. During the latter period typhoid fever was almost unknown, and the cholera, which in 1849, or before these changes had been made, was fatal in nearly two hundred cases, was fatal in only fourteen cases in 1854, the time at which the works were under completion. In 1866 there was not a single case in the town.

### Tin Plate Manufacture in Pittsburgh.

A correspondent of the Pittsburgh *Commercial*, describing the tin and plate works of that city, says:

Some two years ago several Pittsburgh capitalists organized a company under the name and style of the United States Tin Plate and Iron Company, and immediately proceeded to erect suitable buildings and place in them the requisite furnaces and machinery.

The buildings are large, substantial and admirably adapted for the purpose, the machinery being of the very latest and most approved description and placed on massive and durable foundations. The works cover about 12 acres of ground.

They contain four puddling and three heating furnaces, four nobling fires, a steam hammer, six pairs of rolls and first-class engine, and two or three pairs of shears of different sizes, all working like clock-work.

The annealing, wash and tinning departments are complete in all their details. The manufacture of tin plate is an entirely new industry in this country; we have heretofore been dependent on foreign countries for the article, and until very recently there has been no attempt made at its manufacture. There are a couple of other establishments in other localities that have tried but have succeded only in producing what is termed "terne" or "plate." This establishment has been in operation for some time, but in consequence of circumstances not necessary to be here mentioned, have not, until very recently, been able to produce the desired and satisfactory articles, but now they manufacture an article equal if not superior to the best product of England or Wales. As a natural consequence the company feel jubilant, and have resolved to erect an additional plate mill, being convinced that the demand for their specialty will be far beyond their present capacity.

The credit and honor of this success, next to the gentlemen who invested their capital in the enterprise, are largely due to the excellent skill and management of the superintendent and his two foremen. John Coles, Esq., late of Leechburg, Armstrong county, is the superintendent. Mr. Coles has had large experience in managing, and is in every way qualified for the position.

The tinning department is under the control of Mr. John D. Morgan, late of Briton Ferry, South Wales.

The roll turning and keeping the rolls in position (a delicate and very responsible situation in consequence of the accuracy in which the rolls must be kept in order to produce even and unblemished sheets), is under the management of Mr. William Richards, late of Math, South Wales.

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**A Coal Corner in the Philadelphia Market.**—A dispatch from Philadelphia, under date of the 25th instant, says: The extreme scarcity of coal in the north-western section of this city is the prevailing consideration in many households. During the week stove coal has been retailing as high as $8·50 per ton, and there is great difficulty in obtaining it at that price. The latest information from Pottsville indicates a determination of the miners to stand out for their persistently asked-for-schedule of prices, and as they claim to be in possession of sufficient funds, the prospect of resumption is exceedingly unsatisfactory. The quantity of coal sent from the Schuylkill region last week was 18,245 tons, against 114,733 tons by railroad and canal for the corresponding week of last year, being a decrease of 96,488 tons. The quantity of anthracite sent for the week from all regions was 213,974 tons, and 65,022 tons of bituminous; for the week, 278,096 tons, against 457,773 tons for the corresponding week of last year, being a decrease of 179,677 tons. The supply sent from all regions so far this year is 3,741,963 tons, against 4,880,400 tons to the same period last year, being a decrease of 1,138,437 tons. The decrease in the supply of anthracite is 1,317,515 tons.

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**Coal Statistics for 1874.**—We are in receipt of the *Miners' Journal Coal Statistical Register* for 1875, containing full statistics of the coal trade of the United States for 1874, from which we will make elaborate quotations at an early day. The *Register* contains over 70 pages of most valuable matter, and is sold at the exceedingly low price of 30 cents. Address the *Miners' Journal*, Pottsville, Pa.

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The Reading (Pa) *Times* says: The first wrought iron driving wheels ever manufactured in this country were made by Mr. James Mullen, 804 Penn street, this city. They were used on the engine "Stag" which belonged to the Roadway Department of the Reading Railroad Company. They were made in the year 1847, and at that time Mr. Mullen was master blacksmith of the Reading Railroad Company. They have been pretty much in use ever since. After the model then introduced the wheels have always been made, and it is but justice to say that there are no better driving wheels in the country. Mr. Mullen has long since retired from the position he then held, but he still retains a warm interest in mechanical affairs.

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The Board appointed by the President of the United States to test Iron, Steel and other metals will, receive proposals until June 1st, 1875, for the construction of a Testing Machine, suitable and convenient, in all respects, to subject to either tension or compression specimens of all lengths up to thirty (30) feet, and of any width up to thirty (30) inches, and having a maximum capacity of eight hundred thousand (800,000) pounds, and also capable of accurately measuring the strains imposed. The said machine is to be furnished complete with all necessary tools and apparatus, with driving machinery and holding-down bolts ready for erection and operation, and to be delivered at the place of manufacture within five (5) months of the date of contract.

It will be further demanded that said machine shall be taken back in part payment for a machine of two million (2,000,000) pounds capacity, more or less, at an early date, which may be specified in the proposal, and upon terms which shall also be stated in full as in the proposal for the first named machine.

A satisfactory guarantee of efficiency and of completion within the specified time must accompany each proposal, and a forfeiture of one hundred (100) dollars per day will be exacted in case of non-fulfillment of the conditions of the contract.

The general proportions of the machines are to be based upon a factor of safety of not less than six (6).

Proposals endorsed "Proposals to furnish a Testing Machine," accompanied by complete specifications and general working drawings, showing dimensions of the principal parts, must be addressed to the President of the Board,

**Lt. Col. T. T. S. LAIDLEY, U. S. A.,**
**Watertown, Mass.**

The privilege is reserved of rejecting any or all proposals. By order of the Board.

**R. H. THURSTON,**
**Secretary.**

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Having established an Agency in Germany, we invite manufacturers to correspond with us regarding the introduction and sale of articles suitable for the European market. Address
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I have three patents for Dies, Machinery, and Tools for making Augers and Bits, each running seventeen years; dated as follows: Dec. 19, 1865; January 31, 1866, and July 3, 1866. **There is a special claim on each of the Dies.** All persons infringing on said patents will be held responsible to the extent of the law. **Russell Jennings.**
DEEP RIVER, Conn., Sept. 7, 1874.

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In successful operation since 1845. Rare opportunity to secure an old and established business. Stock of General Hardware, Iron, Nails &c., &., will invoice $7000 to $8000. Two story brick business room, 25x90, with cellar under all, for $300. After first payment will make such terms as will be easy, and cannot fail to suit purchaser. Will assist purchaser at starting, if necessary. Satisfactory reasons for selling will be given.
Address, **C. U. RAYMOND,**
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A large lot of Machinery, Shafting, Belting, cut and recut, complete and unfinished Nuts and Bolts, from the Wilmington, Illinois, Bolt and Nut Works, in bankruptcy.

District Court of the United States for the Northern District of Illinois, in Chicago. In the matter of George Chapman and Charles J. Jukes, bankrupts. Notice is hereby given that the undersigned assignee will receive proposals for the purchase of said Machinery, Nuts and Bolts, &c., &c., until Tuesday, the first day of June, 1875, at 3 o'clock, p. m., subject to the approval of the court. If no satisfactory offer is received, will sell the entire lot at Public Auction, at the Central Warehouses, corner of Rush and Kenzie Streets, Chicago, Ills., on Tuesday, the 8th day of June 1875, commencing at 10 o'clock, a. m. Said Machinery consists of about 29 pieces, such as Nut Machines, Bolt Headers, Threaders and Turners, Rimmers and Toppers, a Tumbler, a new Drill, a new Fan, new Lathe and Fixtures, new Planer and Tools, new Anvils and Vises, six new Iron Wheelbarrows, &c., &c.

A schedule of this property may be seen at my office, in Wilmington, Ills., also at the office of Walter Burnham, Att'y, rooms 5 and 7, Nos. 76 & 78 Dearborn Street, Chicago, Ills. The Goods may be examined at Wilmington, Illinois, until Thursday, May 27th, and then at the Central Warehouses, corner of Rush and Kenzie Streets, Chicago, Ills., until day of sale. ***ERASTUS W. WILLARD,***
TERMS CASH. ***Assignee.***

## FOR SALE.

An ⅜ inch mill train for making Merchant, Band and Hoop Iron. Will be sold cheap.
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The Buildings, Machinery and Appliances are all in prime order, and the assortment of Patterns, &c., for Stove, Range or Heater work, unsurpassed.

Address, for terms or other particulars,
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**Hardware Business**

In a growing manufacturing town, one of the best locations in Vermont. Business well established and profitable. Stock about $10,000, in good order This affords an excellent opportunity for a party with small capital to secure a paying business.
Address, **W. R. BIXBY & SON,**
**Vergennes, Vt.**

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A part or whole interest in a good Manufacturing Business protected by Patents. May be moved to any part of the country. A large business may be done, paying over 100 per cent. profit on all goods sold. Reason for selling, lack of capital. For information address, **MACHINERY,**
Office of ***The Iron Age,*** 10 Warren St., N. Y.

## For Sale,

**A Blake's Ore and Stone Crusher and Breaker.**

Usual size for furnaces; but little used and in excellent condition. Price very low.
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## For Sale,

**Stove and Tin Business.**

Will sell, on good terms, one of the best arranged House Furnishing Stores in Canada West, at St. Thomas. The premises are roomy, the buildings having been arranged especially for this trade, with Tinsmith's workshops and benches complete for 12 men.

**Present Stock about $6000.**

St. Thomas is the head quarters of the Canadian Southern Railway Co. To a practical, energetic man this offers unusual advantages. Business well established and with good connection. Reason for disposal, present proprietors increasing their wholesale and retail Hardware Store next door to the above premises. Address
**HORSMAN & HORSMAN,**
Iron and Hardware Merchants,
**St. Thomas, Canada West.**

## FOR SALE,

at 10c. a copy, general ***Spanish Weekly Market Review,*** written and published by the subscriber, 29 April, 1875, number 187, circulating in Mexico, the West Indies, Central and South America, including Brazil, Spain and Manila, on which certain standard articles of American manufacture are quoted. The undersigned is also

**Translator for Manufacturers and Land Companies,**

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**ENGLISH,**
**SPANISH,**
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Spanish Catalogues got up correctly and with despatch. Address, **C. KIRCHHOFF,**
***Metal Reporter of "The Iron Age,"***
**Box 3091, N. Y.**

# Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, April 28, 1875.

The past week has been quiet and comparatively uneventful in the financial markets, and there is little of general interest to report. Money continues abundant and easy. Borrowers on call are freely accommodated at 2½ @ 3 per cent., and the rate of discount on prime mercantile paper is 4½ @ 6 per cent.

The gold market has been quite steady, and the fluctuations in the premium unimportant. There has been a good currency demand for cash coin, and a small consideration has been paid for its use.

The following table shows the daily range of the premium:

| | Highest. | Lowest. |
|---|---|---|
| Thursday | 115 | 114⅞ |
| Friday | 115⅜ | 115⅛ |
| Saturday | 115⅜ | 115⅛ |
| Monday | 115⅜ | 115⅛ |
| Tuesday | 115⅜ | 115⅜ |
| Wednesday | 115⅜ | 115⅜ |

The bond market continues firm, and the highest currrency prices ever quoted have been realized by those with bonds to sell. The market for railroad bonds is unusually strong, and for these and other desirable investment securities there is an active and legitimate demand. We give below the closing quotations of governments.

The stock market has been devoid of speculative activity, but has been strong, with the exception of certain Western railroad shares, which are regarded with suspicion by operators. As the rule, railway shares are strong and active. The principal dealings of the week have been in Union Pacific, Pacific Mail, Western Union, Northwest, Lake Shore, Erie, Ohio & Mississippi and Wabash.

The bank statement shows a gain in total reserve of $1,713,000, and, by the reduction in total liabilities, a gain in the surplus reserve of $1,883,150, the banks now holding $11,534,625 more lawful money than the law requires. The legal tenders in the banks are now close on to $54,000,000, which is a larger amount than held at any time during the past eight weeks. Considering that the May interest will soon begin to come out freely, it is a fair calculation that, making due allowance for specie exports, the banks will gain rather than lose specie in the immediate future. The following is a comparison of the averages for the past two weeks:

| | April 17. | April 24. | Differences. |
|---|---|---|---|
| Loans | $277,964,500 | $275,886,000 | Dec. $2,078,500 |
| Specie | 14,013,200 | 12,045,900 | Dec. 1,967,300 |
| Leg. Ten. | 52,290,000 | 53,970,300 | Inc. 3,680,300 |
| Deposits | 218,406,900 | 217,926,300 | Dec. 480,600 |
| Circulation | 21,332,800 | 21,146,200 | Dec. 186,600 |

The following tables show the foreign trade movements for the week:

IMPORTS.

| | 1873. | 1874. | 1875. |
|---|---|---|---|
| Total for week | $10,340,763 | $7,228,874 | $6,877,943 |
| Prev. reported | 139,526,585 | 130,944,307 | 111,994,074 |
| Since Jan. 1 | $149,867,348 | $138,173,181 | $118,872,017 |

Among the imports of general merchandise were goods valued as follows:

| | Quant. | Value. |
|---|---|---|
| Brass goods | 6 | 666 |
| Bronzes | 36 | 6,492 |
| Chains and anchors | 10 | 605 |
| Cutlery | 56 | 17,406 |
| Gas fixtures | 2 | 723 |
| Guns | 61 | 5,498 |
| Hardware | 34 | 4,437 |
| Iron, pig, tons | 725 | 15,601 |
| Iron, sheet, tons | 7 | 1,014 |
| Iron cotton ties | 563 | 1,973 |
| Iron, other, tons | 24 | 1,965 |
| Metal goods | 129 | 14,993 |
| Needles | 12 | 5,133 |
| Old metal | | 414 |
| Platina | 2 | 8,119 |
| Per. caps | 10 | 1,380 |
| Saddlery | 6 | 895 |
| Steel | 849 | 15,309 |
| Tin, boxes | 11,326 | 93,030 |
| Tin, 1271 slabs | 153,858 | 27,314 |
| Wire | 164 | 2,872 |
| Zinc | 88,547 | 5,197 |

EXPORTS, EXCLUSIVE OF SPECIE.

| | 1873. | 1874. | 1875. |
|---|---|---|---|
| For the week | $5,355,290 | $7,296,229 | $3,909,349 |
| Prev. reported | 81,767,856 | 83,213,721 | 73,369,258 |
| Since Jan. 1 | $87,123,146 | $90,508,250 | $76,271,507 |

EXPORTS OF SPECIE.

| | |
|---|---|
| Total for the week | $1,913,257 |
| Previously reported | 17,665,348 |
| Total since January 1, 1875 | $19,578,605 |
| Same time in 1874 | 9,972,898 |
| Same time in 1873 | 17,994,519 |

Government bonds at the close were firm at the following quotations:

| | Bid. | Asked. |
|---|---|---|
| U. S. Currency 6's | 121½ | 124 |
| U. S. 6s 1881, reg | 121¾ | 121¾ |
| U. S. 6s, 1881, cou | 123¾ | 123¾ |
| U. S. 1862, 5-20 reg | 116¼ | — |
| U. S. 5-20 1862, cou | 119⅝ | 119⅝ |
| U. S. 5-20 1864, reg | 117⅛ | 118 |
| U. S. 5-20 1864, con | 121¾ | 121¾ |
| U. S. 5-20 1865, reg | 118¾ | 119¼ |
| U. S. 5-20 1865, cou | 122¾ | 123⅛ |
| U. S. 5-20 1865, reg. new | 121¼ | 121¾ |
| U. S. 5-20 1865, cou | 121¾ | 122 |
| U. S. 5-20 1867, reg | 121⅜ | 121¾ |
| U. S. 5-20 1867, cou | 123¼ | 123⅜ |
| U. S. 5-20 1868, reg | 121⅝ | 122¼ |
| U. S. 5-20 1868, cou | 122⅞ | 123⅛ |
| U. S. 10-40 reg | 116 | 116⅛ |
| U. S. 10-40 cou | 116¾ | 117¼ |
| U. S. 6s, 1881, reg | 115⅝ | 115⅞ |
| U. S. 6s, 1881, cou | 117¼ | 117⅜ |

The following were the highest and lowest prices of stocks to-day:

| | Highest. | Lowest. |
|---|---|---|
| N. Y. Cen. & Hudson Consolidated | 106¼ | 105 |
| Lake Shore | 71⅛ | 70¼ |
| Rock Island | 106⅜ | 105⅛ |
| Delaware, Lackawanna & Western | 122 | 119⅝ |
| Cleveland & Pittsburgh | 93¼ | 92¼ |
| Illinois Central | 106¼ | 105⅝ |
| Wabash | 16¼ | 15⅛ |
| Harlem | 136 | 136 |
| Canton Land Co. | 70¼ | 70⅛ |
| Western Union Telegraph | 80⅛ | 79 |
| Atlantic and Pacific Telegraph | 27 | 26¼ |
| Northwestern | 42¼ | 42¼ |
| Milwaukee & St. Paul | 37⅛ | 37 |
| " " Pref. | 57¼ | 57¼ |
| Panama | 166 | 164 |
| Pacific Mail | 45¼ | 44¼ |
| Erie | 30⅛ | 29⅝ |
| Ohio & Mississippi | 27¼ | 27⅛ |
| Union Pacific | 78¼ | 75 |
| Kansas Pacific | 25 | 24¼ |
| do Preferred | 41 | 41¼ |
| Missouri Pacific | 54⅝ | 54¼ |
| Atlantic & Pacific Preferred | 17⅛ | 17 |
| C., C. & Ind. Cen | 6¾ | 6¾ |
| Hannibal and St. Joseph | 25¼ | 26 |
| " " Preferred | 31¼ | 31¼ |
| New Jersey Southern | 8¼ | 7 |
| Consolidated Coal | 49¼ | 48 |
| Wells, Fargo & Co. Express | 90¼ | 90¼ |
| Am. Mer. Union Express | 64¼ | 64 |
| United States Express | 53 | 51 |

## GENERAL HARDWARE.

Trade in domestic goods is, generally speaking, of a satisfactory character, and continues to be transacted chiefly through mail orders. There is little or nothing to report regarding prices, and our quotations of leading goods fairly represent the actual selling prices. We hear of little disposition on the part of manufacturers or dealers to shade the current rates.

In Foreign Hardware business lacks that energy which it is reasonable to expect at this season of the year; but although the complaints of dullness seem general in this branch of the trade, it can be accounted for in part by the tendency of dealers always to hold back their orders at the close of the month, and although we do not look for any great activity in the near future, still the opening of May will doubtless bring improvement to trade circles. Prices continue without quotable change.

In all the recent additions to manufacturers' lists, whether in the shape of appendices and supplements, or as new pages to be pasted in their respective catalogues, we notice a predominance of small cast iron figured goods with ground surfaces, bronzed in oil. This class of goods has become very popular within the last few years, taking a place, not heretofore filled, between plain japanned and cast brass. We believe this style of finish was first introduced in shelf Hardware by the Tucker Manufacturing Company (now out of business), who claimed a patent upon it, and used it on a line of Lamps, Gas Fixtures, Clocks and Shelf Brackets. The Tucker Bronzed Shelf Brackets were so well received by the Hardware trade that Messrs. P. & F. Corbin introduced a line of Door Butts with the same finish; but to Sargent & Co. is due the credit of first presenting a general line of small Bolts, Catches, &c., in this finish, under the title of "Berlin Bronzed." They were soon followed by other manufacturers, so that now the trade are well supplied with figured bronzed goods. Whether these goods are the "Copal Bronzed" of P. & F. Corbin; the "Figured Enamelled" of The Hart, Bliven & Mead Mfg. Co., and of the Union Manufacturing Company; the "German Bronze" of Rick Bros. and Wright, Dana & Co.; Judd's "Maroon Finish;" Sargent's Berlin Bronzed; the "American Dark Bronzed" of Reading Hardware Company; Mallory, Wheeler & Co.'s "English Bronzed" on Lock Fronts and Door Knobs, or the "Adamantine Bronzed" of Peck, Stowe & Wilcox, it matters little, so far as finish is concerned, as it is but one thing under different names. Where there is a difference it is in the patterns, some manufacturers displaying more taste and skill in their designs than others.

The demand for Nails has fallen off considerably, but prices seem to be firmly established at our quotations. The New England mills continue to be non-producers, and we are informed that there is little likelihood of any early resumption of work. Some concerns represented in this city report their assortments so badly broken that they have been obliged to come into the market as buyers to enable them to fill the orders of their regular customers. We continue to quote 10d, in lots of 200 kegs and over, $3·25; small lots are quoted at $3·35 @ $3·40, net.

The Russell & Erwin Manufacturing Co. have added to their assortment of real Bronze Hardware a new line of Bronze Butts of handsome design and finish, which is classed on their list, No. 11. These goods are made with a fancy knuckle, front and back. The same company have reduced the list price of their patent cast iron Gem Bake Pans as follows: No. 10, per dozen, $13·00; all other numbers $10·00 per dozen; the discount remains as before.

Landers, Frary & Clark have issued the following net list for "Turnbull's Improved Ice Balance." These goods are new to the trade. They were patented June 16th, 1874:

| No. | 201 | 202 | 203 |
|---|---|---|---|
| | 100 lbs. x 1 lb. | 200 lbs. x 2 lbs. | 300 lbs. x 3 lbs. |
| Per doz. | $24·00 | 30·00 | 36·00 |
| To the trade strictly | 18·00 | 22·50 | 27·00 |

They also offer their "Standard Letter Scale," which is a very neat and useful article. The Letter Scale has combined with it a double Ink Stand and Pen Rack. It is well finished in Bronze, and is placed on the market at $30 per dozen.

Laughland & Co., No. 230 West street, have issued the following revised price list of English Metal Coated Wire, under date of 26th instant:

PRICE LIST OF ENGLISH METAL COATED WIRE.

| Gauge. | Common Tinned. | Charcoal Tinned. | Galvanized. | Average Length per Coil. |
|---|---|---|---|---|
| | Price in cents per lb. | | | Yards. |
| 3 | 9¼ | .... | 8¼ | 130 |
| 4 | 9¼ | .... | 8¼ | 155 |
| 5 | 10¼ | .... | 8¼ | 186 |
| 6 | 10¼ | 12¼ | 8¼ | 223 |
| 7 | 10¼ | 13 | 8¼ | 269 |
| 8 | 10¼ | 13 | .... | 322 |
| 9 | 11 | 13¼ | 9¼ | 382 |
| 10 | 11 | 13¼ | 9¼ | 460 |
| 11 | 11¼ | 13¼ | 10¼ | 595 |
| 12 | 11¼ | 13¼ | 10¼ | 783 |
| 13 | 11½ | 13¼ | .... | 1006 |
| 14 | 11¼ | 14 | 10½ | 1305 |
| 15 | 12 | 14 | 11 | 1715 |
| 16 | 13¼ | 14½ | 11½ | 2188 |
| 17 | 12½ | 14¼ | 11¼ | 2900 |
| 18 | 13 | 14½ | .... | 3857 |
| 19 | .... | .... | 12¼ | 4847 |
| 20 | 14¼ | 16¼ | 12½ | .... |
| 22 | 15¼ | 17¼ | .... | .... |
| 24 | 16¼ | 18¼ | .... | .... |

The above Wire is put up in 68 lb. coils, with the following exceptions:
No. 9, in 56, 60 and 72 lb. coils.
Nos. 22 and 24, in 12 lb. coils.

GALVANIZED WIRE STRAND,

For Fencing, Vineyards, Railway Signal Pulleys, &c. Put up in bundles of 400 yards each. That for Fencing has seven strands, that for Vine Arbors three strands. The following sizes are kept in stock.

*Seven Strand.*

| Gauge. | Price in cents per lb. | Average weight per bundle. |
|---|---|---|
| 3 | 9¼ | 161 lbs. |
| 4 | 10 | 127 " |
| 5 | 10¼ | 98 " |
| 6 | 11 | 78 " |
| 8 | 18 | 68 " |
| 9 | 18¼ | 63 " |

*Three Strand.*

| Gauge. | Price. | Weight. |
|---|---|---|
| 8 | 10 | 58 |
| 9 | 10¼ | 47 |
| 10 | 10¾ | 45 |

GALVANIZED FENCING WIRE.

No. 9, put up in 112 lb. coils of about 626 yards; price, 7 cents per pound. No. 10, put up in 100 lb. coils of about 781 yards; price, 7¼ cents per pound.

BEST SELECTED BRIGHT SPRING WIRE.

Nos. 7, 7½, 8¼ and 9, at 6¼ cents per lb.
Terms, net cash.

Charles Gooch, No. 432 Market street, Philadelphia, Pa., and 109 Sycamore street, Cincinnati, Ohio, desires the attention of dealers in Ice Cream Freezers to his Patent I. X. L. Freezers, which, although well known throughout the West, have been but a short time introduced in the Eastern markets. The manufacturer says of these goods that they have always been sold on their own merits, and he warrants them to give satisfaction in every particular on a fair trial. Sample Freezers will be forwarded to any address if ordered, and a liberal discount is allowed from his list price to dealers. The mechanical construction of these goods is very clearly illustrated in advertisement in our issue of 15th instant, page 16.

Lan & Garlichs, No. 72 Beekman street, have established an agency in Germany for the sale of articles of American manufacture adapted for the European markets. They invite the correspondence of manufacturers desirous of the introduction of their products in Europe. An advertisement to this effect will be found on the opposite page.

The New York Bridge Co. requiring the old stand of Ogden & Wallace, No. 342, 344 and 346 Pearl streets, they have removed their Iron business to their new and commodious warehouse, Nos. 85, 87, 89 and 91 Elm street, one block below Canal street, where they will keep in stock a full assortment of all descriptions of Iron.

Joseph Graff & Co., Axe manufacturers, Beaver Falls, Pa., state in a circular, that notwithstanding the destruction of their extensive works by fire on the 17th of March last, their business will suffer but little interruption. Their warehouse containing the finished stock was uninjured, with which they will be able to fill early orders. They have a large force of men at work rebuilding, and expect to have their new factory fully equipped and running by the middle of May. They solicit orders for the fall trade.

The North Carolina Handle Co., V. G. Hurdley, agent, have removed from No. 105 to No. 79 Reade street.

## BRITISH IRON MARKET.

(*Specially reported by cable for The Iron Age.*

WEDNESDAY, April 28, 1875.

**Scotch Pig.**—The market is quiet, and prices are steady. A fair business is doing. The following are makers' quotations:

| | |
|---|---|
| Gartsherrie No. 1 | 76/ |
| Coltness No. 1 | 78/ |
| Glengarnock No. 1 | 74/ |
| Eglinton No. 1 | 69 6 |

**Manufactured Iron and Rails** remain without change.

## IRON.

**American Pig.**—The condition of the Iron market appears to be anything but encouraging, and there seems to be no reason to hope for any improvement very soon. The troubles in the coal regions still continue, but without affecting the price of Iron. The demand is exceedingly stagnant, and the wants of the country seem to be even less than the limited production. Several lots have been pressed for sale for cash during the week, without effecting sales, the only offers being from $3 to $5 less than quotations. We note the sale of 200 tons White Iron at $18·50. We still quote Lehigh brands, Foundry No. 1, $28; Foundry No. 2, $26; Gray Forge, $24 @ $26.

**Scotch Pig.**—The market seems to be completely demoralized. Some sales of Coltness have been made at a price so low that importers are reluctant to name it. $34 @ $35 is now an extreme price. Eglinton is held at $31 @ $32, but no sales. We quote Glengarnock $34. During the week about 300 tons Coltness and other brands have been put in store, and there is now more in warehouse than there has been at any time within six months.

**Rails.**—We notice considerable inquiry here, with some sales, and hear of large transactions in the West. We continue to quote $48 @ $53 for American, at works.

**Old Rails.**—The market continues as previously noted, the price being nominally $29 @ $30. As in the case of New Rails, there has been more doing in the West than in the East.

**Scrap.**—The market shows less firmness than at our last writing. We now quote Wrought Scrap $34 @ $35. Transactions have been small.

## METALS.

**Copper.**—The Copper market is in a rather uncertain state. The large business for export has been consummated—about 5,000,000 pounds for June to September, inclusive, on a basis of about 21c., currency. New business is on the "tapis" to the extent of between 5,000,000 and 6,000,000 pounds from the Lake companies to dealers and to consumers. This transaction is not yet consummated, but probably will be within a day or two. The spring opening in the Copper and Brass trade has thus far proved a disappointment, and unless a favorable change soon occurs in this respect, the predictions that we shall produce considerably in excess of our domestic wants in 1875, will, in the end, prove to have been correct. This movement is intended to get the market better under control, yet the one or the other of the minor companies have been hesitating in joining this combination. Last year's movement, then undertaken by one firm, principally failed because there were small companies whose production had not been secured, and the continual offerings of these outside lots finally broke down the corner. This time a fair chance has been offered to whosoever wished to secure a supply at a reasonable figure, while the companies, large and small, have an opportunity of guarding against a possible severe decline in the future. And as for the consumers at large, they are of course actuated by their own views and necessities; what they desire most is steadiness in value. The price proposed to be paid to secure the amount alluded to is 22c. for June to October, inclusive. As the Copper manufacturers are here at present united action may now be had. Sales for the week have been limited to 50,000 pounds. Lake, on the spot, at 22⅝c., and 200,000 early May delivery at 22½c. The demand is light, but prices are firm at 22½c., cash, and 22⅝c., May delivery. Baltimore is steady at 22½c. From Europe cable news came to hand on Saturday, the 24th inst., when Chili Bars stood £82; Best Selected, £87 @ £88; and Wallaroo, £90. The manufactures of Copper are well sustained at the following rates: New Sheathing, over 12 oz., 28c.; Bolts, 30c.; and Braziers, over 16 oz., 30c.; Bronze and Yellow Metal Sheathing, 21c.; and Yellow Metal Bolts, 28c., net cash.

**Tin.**—One of the East India London firms, in writing to its agent here, under date of April 12, alludes to Tin in the following terms: "The export from Australia to England in March was 525 tons. Unless there be some sure evidence of some falling off in the supply, we doubt if the value can hold at the present price of £86 for Straits, but any great reduction would no doubt wake up speculation, especially if any general improvement in trade occure." Since this was written Straits Tin declined, a couple of days ago, to £85. It now remains to be seen whether the anticipated decrease of production in the Straits settlements, together with a revival in the demand, will, after a while, start a fresh movement for a rise in Europe, as here intimated. Consumption there, it should not be forgotten, has been fair all along, and can hardly help improving. L. and F. is wired £90. Our own market has been quite dull. We quote, in gold: Straits, 20¼c. @ 20½c.; English Common, 19½c. @ 19¾c.; English Refined, 19¾c. @ 20¼c.; and Banca, 24½c. *Tin Plates.*—The market has been steady, with a tolerably good jobbing trade. We quote ordinary brands, in gold, per box: Charcoal Bright, $9·12½ @ $9·50; ditto Ternes, $8 @ $8·50; Coke Tin, $7·25 @ $7·75; and ditto Terne, $7 @ $7·25.

**Lead.**—As was to be foreseen, the proximity of the active season has been favorably influencing the position of this metal, both in Europe and here, during the past week or two. Accounts from the West are decidedly stronger. A letter but a week old has been shown to us from a reliable party out there, from the heart of the mining region, asserting that little bullion will be sent East from the Territories for the next sixty days. The furnaces have stopped work on account of bad roads, and the Omaha works are threatened with floods, which news has spread a strong feeling at St. Louis, Chicago, and here. Offers per wire from St. Louis have ceased for the moment in consequence, and after the sale of 100 tons Newark Lead at 5⅜c., gold, since our last, the market is now strong at 5½c. to 5·90c., gold, on the spot, for Domestic, the bulk of the stock here in private hands being firmly under control, mostly of one house. While the situation has thus undergone a radical change at home, Europe, too, is still on the rise. Thus we hear by cable today that for fine Lead an advance of from 10/ to 15/ per ton is now demanded. Common foreign we nominally quote 6¾c., gold. The manufactures of Lead are firm, Bar at 8¾c., Pipe at 9c., and Sheet at 9½c., less 10 per cent. to the trade.

**Spelter and Zinc.**—Nothing has transpired in Foreign, which we nominally quote 7c. @ 7¼c., gold. Domestic is not abundant; the sales for the week sum up between 30 and 50 tons at 7c., currency, for larger lots, and 7½c., currency, smaller ones. For the latter description the market is decidedly firm. Should business be more fully resumed soon, we may witness a still further improvement, the metal being cheap even at the current figure. Europe is, on the whole, quite strong, but less active for the want of an available supply at the chief distributing centers. *Sheet Zinc* still remains dull at 9c. @ 9½c., gold, all sizes.

**Antimony**—Has been getting stronger as we proceed, and the demand develops. We quote the market firm at 12¼c. @ 12⅝c., gold, with steady sales to consumers. London, £56.

## OLD METALS, PAPER STOCK, &c.

The Old Metal market is still without any activity, and dealers are accumulating stocks without much prospect of soon selling them. The market for Paper Stock, Rags, &c, is fairly active, and some qualities are in light receipts. Cotton Canvas and Hemp Rope are scarce in the market, though dealers as yet find little difficulty in filling orders. The demand for White Rags, No. 1, has fallen off since last week, and prices are somewhat weaker. For other articles there is a fair inquiry. We quote the following as the current purchasing rates:

*Old Metals.*—Copper, 16c. @ 17c. per lb.; Yellow Metal, 11c.; Brass, 10c. @ 12c.; Composition, heavy, 13c. @ 14c.; Lead, solid, 5½c.; Tea Lead, 4½c.; Zinc, 4¼c. @ 4½c.; Pewter, No. 1, 18c.; do., No. 2, 8c. @ 12c.; Spelter, 5c. @ 5½c., Wrought Iron, 1¼c.; Sheet do., ½c.; Cast, do., ¼c.; Machinery, do., ¾c.

*Rags, &c.*—Canvas, Linen, 5c. @ 5½c.; do. Cotton, No 1, 6c. @ 6½c.; No. 2, 2½c.; White, No. 1, 6½c.; No. 2, 4½c.; Colored, do., 2c. @ 2½c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 5c. @ 5½c.; Gunny Bagging, 1¼c.; Jute Butts, 1¾c. @ 2c.; Kentucky Bagging, 3c.; Book Stock, 3c.; Waste Paper and Scraps, 1½c.; Kentucky Bale Rope, 4c.; Oakum Junk, No. 1, 4½ @ 5c.; do. No. 2, 3c.; Tarred Shaking, 1c. @ 1½c.; Grass Rope, 2½c. @ 3c.

## COAL.

We have very little change to report in this market since our last, and nothing unusual has transpired during the past week in that section of the mining regions where the men are on strike. The demand for Anthracite is far ahead of the supply, and orders are being booked ahead for future delivery.

The following are the prices charged by the Delaware and Hudson Canal Company for Coal, deliverable f. o. b. at Rondout or Wechawken, during the month of May, per ton of 2240 lbs.:

| | |
|---|---|
| Furnace Lump | $4·80 |
| Steamer Lump | 4·90 |
| Grate | 5·00 |
| Egg | 5·15 |
| Stove | 5·60 |
| Chestnut | 4·60 |

The Philadelphia and Reading Coal and Iron Company, Lehigh Exchange and Lehigh and Wilkesbarre Coal Company, issue no circulars for the month of May, as they are shut off from their usual supplies by the strike.

We quote as follows: Anthracite, $4·35 @ $6·25; Cumberland, $6·75 @ $7; West Virginia, $6·75 @ $7; James River Steam, $6·25; James River Carbonite, $9 @ $9·50; Kanawha House, $14·25; American Gas, $7 @ $7·25; American Cannel, $12 @ $14; Pennsylvania and Westmoreland, $6·75; Murphy Run, $7·40; Newburg Orrel, $7·50; Sterling Ohio, $12; Ince Hall, $17 @ $18; Liverpool House Cannel, $17; Liverpool Gas, $12; Newcastle Gas, $7; Scotch, $7·50 @ $8.

The Coal transported over the Cumberland Branch Railroad during the week ending April 24, 1875, amounted to 6086 tons, as against 6415 tons shipped in the corresponding period of last year, showing a decrease of 329 tons. Over the Cumberland and Pennsylvania Railroad, for the same period, the shipments were 50,016 tons, against 51,823 tons shipped in 1874, a decrease of 1807 tons. The aggregate amount of Cumberland Coal shipped by the various companies so far this year amounts to 444,425 tons.

## IMPORTATIONS.

***Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending April 27, 1875:***

***Hardware.***

Boker Hermann & Co.
Metalware, cks., 5
Mdse. pkgs., 1
Berbecker Julius & Co.
Casks, 13
Coltier & Co.
Cases, 1
Field A. & Co.
Casks, 2
Hildick A. H.
Mdse. pkgs., 1
Harmar Wm.
Tinware, cs., 2; cks., 1
Laughland & Co.
Wire, pkgs., 12
Lawton Bros.
Casks, 2
Moore's J. P. Sons,
Mdse. pkgs., 4
Per. caps, cs., 2
Gun wads, cs., 6
Mason John W. & Co.
Wire rope, coils, 12
Merchant S. L. & Co.
Files, cs., 1
Noyes & White,
Per. caps, cs., 2
Randall R. J. & Roberts,
Cases, 1
Spies, Kissam & Co.
Mdse. pkgs., 3
Empty cartridge cs., cases, 4
Schuyler, Hartley & Graham,
Guns, cs., 2
Cases, 1
Arms, cs., 3
Taylor Thos.
Wire, cks., 1
Tomes Francis & Co.
Cases, 1
Ullmann S.
Metalware, cs., 1
Van Wart & McCoy,
Guns, cs., 2
Wiebusch & Hilger Mfg. Co.
Mdse. pkgs., 10
Files, cks., 1
Gun caps, cs., 2
Wetzler M.
Cases, 12
Windmuller L. & Roelker
Packages, 8
Zitteman Bros.
Metallic caps, cs., 15
Order.
Files, cks., 12
Casks, 17
Cases, 7
Without bills of lading.
Machine wire, cs., 1

***Iron.***

Henderson Bros.
Pig, tons, 200
Laughland & Co.
Hay bands, bdls., 510
Lang W. Bailey & Co.
Mdse. pkgs., 25
Naylor & Co.
Bars, 2614
Mdse. pkgs., 620
Pieces, 318
Scrap, tons, 41
Phelps, Dodge & Co.
Sheet, bdls., 240
Order.
Pig, tons, 109
Hoop, bdls., 210

***Steel.***

Brown Wm.
Cases, 29
Bundles, 46
Gardner J. W.
Bundles, 115
Hugill Chas.
Mdse. pkgs., 126
Hogan John.
Mdse. pkgs., 17
Jacobs, Strouse & Co.
Strips, cks., 4
Naylor & Co.
Tires, cs., 60
Cases, 34
Bars, 28
Axles, 8
Frog points, 1
Railway leaf and volute spring, tons, 54
Prosser Thos. & Sons,
Tire forgings, 16

***Metals.***

Byrne Joseph & Co.
Tin plates, bxs., 120
Brown Bros. & Co.
Tin, slabs, 332
Michelina S.
Copper, pkgs., 27
Naylor & Co.
Tin plates, bxs., 788
Phelps, Dodge & Co.
Mdse. pkgs., 914
Tin plates, bxs., 7168
Order.
Tin plates, bxs., 1706
Tin, ingots, 231
Tin and terne plates, bxs., 741

## PITTSBURGH.

PITTSBURGH, April 27, 1875.

PIG IRON.—There has been little or no movement in Pig Iron during the past week, and while the general tone of the market is firmer, prices remain unchanged. It is probable contracts could be made for May or June delivery at current rates, but furnacemen generally are asking an advance, and refusing to sell at the figures current for spot delivery; in other words, while $24, 4 mos., is still regarded as the ruling rate for good standard Gray Forge, there are but few sellers, either for present or May delivery, under $25. The mills generally were pretty well stocked prior to starting up, having bought freely during January and February, and the most of them will use up what they have before they make any new contracts, especially at an advance; some of them are reported as having enough in yard and bought to arrive to run their furnaces two to three months, and this being the case it is not likely that they will enter the market for the present, especially as sellers are endeavoring to establish an advance. Even those mills having but little stock, who did not buy when they should have done so, will buy only to supply their immediate wants for the time being, and the indications therefore are that trade is destined to continue quiet for some time to come. Manufacturers cannot form an idea as yet in regard to the future of the market for the product, and this is an additional argument in support of the belief that trade in the raw article is destened to rule quiet for the next few weeks, as buyers are in no mood, as yet, of paying an advance. However, producers appear to be very confident in regard to the future of the market; they contend that the stock of standard Mill Iron here and at points tributary to this point are not near as large as generally believed; that the production is very much reduced, and, furthermore, it is claimed that even taking the reduced cost of ore and labor and fuel into consideration, current rates do not more than cover actual cost, if that. The demand for Foundry grades is also very meagre, and the market continues quiet and unchanged; No. 1, $27 @ $28; and No. 2, $25 @ $26.

MANUFACTURED IRON.—The reports in regard to the actual condition of the market for finished Iron are conflicting; some makers report that orders are thus coming in very freely, and that the outlook is not as bright as they had calculated upon prior to starting up; while others are reported as having sufficient orders booked to absorb their entire production during the next two or three months. Prices are steady, and quotations may be given upon a basis of 2·40 for bars. There is a very good trade in sheet iron, while nearly all the hoop

mills are known to be behind with their orders.

NAILS.—There is a fair degree of activity in the nail trade; manufacturers report that there is no difficulty in selling at current prices, which it is claimed yield no margin for profit. Three dollars, sixty days, is generally regarded as the ruling price, but it is rumored that some orders have been placed here recently below this rate. If the recent troubles at Wheeling should result in a strike the market would no doubt harden, and possibly advance, but the latest advices from that point would indicate that the difficulty is likely to be adjusted.

STEEL.—There is no falling off in trade, which has been fairly active since early in the year. All the mills are in operation, some of them working up to their full capacity, and the outlook warrants the prediction that business will be good all summer. Manufacturers continue to complain of very close margins, but the Steel trade is no exception in this respect. One of our largest and oldest firms report to your correspondent that they did more business last month than ever before during the same period of time since they commenced.

SCRAP IRON continues very dull, as it was very generally expected it would be after the ending of the lock-out, and prices are weak and drooping: No. 1 Wrought, which sold a month or six weeks ago at $37 to $38, cannot now be quoted above $32 to $33, delivered free at mills.

MISCELLANEOUS ITEMS.—The old Wood mill which was purchased by the well known Scrap Iron firm of Mullen & Maloney, about a year ago, has been repaired and will be started up probably this week, nail factory and all. This mill has been lying idle ever since the Wood troubles, a couple of years or more ago.

It is reported that Graff, Byers & Co. have leased the mill recently operated by McKnight, Porter & Co., and will start it up at once.

The Pittsburgh Bolt Company still retains the colored puddlers, and it is said that they are giving entire satisfaction, notwithstanding reports to the contrary have been circulated.

It is said that if the mills had held out three days longer that the puddlers would have given in; that president Harris, of the puddler's union, advised the men to wait three days more, and if the mills did not start up at the end of that time they were then to go to work at $4·50.

## ST. LOUIS.

Messrs. SPOONER & COLLINS, Iron commission agents, 409 North Third street, St. Louis, under date of April 23, report the Iron market as follows: No change to note the past week. Foundry Irons are scarce and prices firm for reliable brands. Mill Irons in good demand. Car Wheel Irons remain dull. We quote prices as follows, on four months:

| | | |
|---|---|---|
| Mo. Stone Coal, | No. 1 F'dry. | $29·00 @ 31·00—4 mos. |
| " " | No. 2 F'dry. | 27·00 @ 29·00—4 mos. |
| " " | No. 1 Mill... | 26·00 @ 28·00—4 mos. |
| " Charcoal, | No. 1 F'dry... | 29·00 @ 31·00—4 mos. |
| " " | No. 2 F'dry... | 27·00 @ 29·00—4 mos. |
| " " | No. 1 Mill... | 26·00 @ 28·00—4 mos. |
| Tenn. Charcoal | No. 1 F'dry.. | 29·00 @ 31·00—4 mos. |
| " " | No. 2 F'dry.. | 27·00 @ 29·00—4 mos. |
| H. R. " | No. 2 F'dry.. | 30·00 @ 32·00—4 mos. |
| Massillon, | No. 1 Foundry.... | 36·00 @ 37·00—4 mos. |
| " | B, No. 1 Foundry.. | 34·00 @ 36·00—4 mos. |
| " | No. 2 Foundry.... | 33·00 @ 34·00—4 mos. |
| Cold Blast Car Wheel, | Mo... | 40·00 @ 42·00—4 mos. |
| " " | Tenn. | 37·00 @ 45·00—4 mos. |
| " " | Hanging Rock..... | 53·00 @ 55·00—4 mos. |
| Mo. Charcoal Blooms..... | | 75·00 @ 85·00—4 mos. |
| No. 1 Wrought Scrap..... | | 1¼c. per lb. |
| Machinery Cast " ..... | | 1c. " |
| Stove Plates..... | | ¾c. " |

## CINCINNATI.

Messrs. L. R. HULL & Co., under date of April 26th, write us as follows: PIG IRON.—The market is quiet and steady. There is the usual current demand, and some round lots have changed hands mostly of Forge Irons. This grade is in good demand at full prices. Foundry Irons can generally be bought at inside figures in moderate quantities, but large lots could not be purchased on same terms. We quote as follows:

HOT BLAST CHARCOAL.

| | | |
|---|---|---|
| Hanging Rock | No. 1..₽ ton. | $29·00 @ 30·00—4 mos. |
| " " | No. 2..... | 27·00 @ 28·00—4 mos. |
| " " | Forge..... | 25·00 @ 26·00—4 mos. |
| Tennessee | No. 1..... | 27·00 @ 28·00—4 mos. |
| " | Forge..... | 25·00 @ 26·00—4 mos. |
| Alabama | No. 1..... | 27·00 @ 28·00—4 mos. |
| Missouri | No. 1..... | 29·00 @ 30·00—4 mos. |
| " | No. 2..... | 27·00 @ 28·00—4 mos. |

HOT BLAST STONE COAL.

| | | |
|---|---|---|
| Missouri | No. 1..... ₽ ton.. | $28·00 @ 29·00—4 mos. |
| " | Forge..... | 26·00 @ 27·00—4 mos. |
| Mahoning | No. 1 ..... | 28·00 @ 29·00—4 mos. |
| " | Forge..... | 26·00 @ 27·00—4 mos. |
| Am. Scotch, | No. 1..... | 26·00 @ 28·00—4 mos. |

COLD BLAST CHARCOAL.

| | | |
|---|---|---|
| Hanging Rock | Car Wheel ₽ tn. | $35·00 @ 50·00—4 mos. |
| Missouri | " " ..... | 43·00 @ 45·00—4 mos. |
| Kentucky | " " ..... | 40·00 @ 42·00—4 mos. |
| Tennessee | " " ..... | 36·00 @ 42·00—4 mos. |
| Georgia | " " ..... | 40·00 @ 42·00—4 mos. |
| Alabama | " " ..... | 40·00 @ 42·00—4 mos. |
| Machinery and Forge..... | | 40·00 @ 42·00—4 mos |
| Blooms..... | | 70·00 @ 90·00 -4 mos. |

## LOUISVILLE.

Messrs. GEO. H. HULL & Co., under date of April 26, writes us as follows: We have no changes to note. The market is quiet, and sales comparatively light. The usual time, 4 mos., is allowed on quotations below:

HOT BLAST CHARCOAL.

| | | |
|---|---|---|
| No. 1 F'dry, from Hanging Rock Ores. | | $28·00 @ 29·00 |
| " 2 " " " " .. | | 26·00 @ 27·00 |
| " 1 Mill, " " " .. | | 25·00 @ |
| " 1 F'dry, from Alabama, Georgia and Tennessee Ores..... | | 26·00 @ 27·00 |
| " 2 F'dry, from Alabama, Georgia and Tennessee Ores..... | | 25·00 @ 26·00 |
| " 1 Mill, from Alabama, Georgia and Tennessee Ores..... | | 25·00 @ |

HOT BLAST STONE COAL AND COKE.

| | | |
|---|---|---|
| No. 1 F'dry, from Hanging Rock Ores. | | $27·00 @ 28·00 |
| " 2 " " " " .. | | 25·00 @ 26·00 |
| " 1 Mill, " " " .. | | 24·00 @ 25·00 |
| " 1 F'dry, from Alabama, Georgia and Tennessee Ores..... | | 26·00 @ 27·00 |
| " 2 F'dry, from Alabama, Georgia and Tennessee Ores..... | | 25·00 @ 26·00 |
| " 1 Mill, from Alabama, Georgia and Tennessee Ores..... | | 24·00 @ 25·00 |
| No. 1 F'dry, from Missouri Ores..... | | 28·00 @ 29·00 |
| " 2 " " " ..... | | 27·00 @ 28·00 |
| " 1 Mill, " " ..... | | 27·00 @ 28·00 |

COLD BLAST CHARCOAL

| | | |
|---|---|---|
| Car Wheel from Hanging Rock Ores.. | | 40·00 @ 50·00 |
| " " Tennessee Ores..... | | 35·00 @ 37·00 |
| " " Alabama Ores..... | | 34·00 @ 40·00 |
| " " Kentucky ..... | | 30·00 @ 42·00 |

## BOSTON.

BOSTON, April 24.—*Pig* is very quiet indeed, and from all accounts just as flat in New York and Philadelphia as here. We have had several parties from these two cities drumming here during the week, not quoting prices, but urging foundry men to name bids. So far as learned not a ton has been placed, but the result has been to impress buyers that somebody is about to wilt, and holding out or refusing to make a value may precipitate the market. The most remarkable feature in the trade is the quoting temper of some, whom it is utterly impossible to impress that naming high prices does not make a value. However, giving them the benefit of the doubts, the values range from $35 down to $30 on No. 1, x, the latter figure about the level at which the occasional sales are made. The quotations made by the New York parties delivered at Hoboken are $27 to $29, No. 1; $24 to $27, No. 2; and $22 to $26, Gray Forge. We particularly note a popular brand of No. 2 x asking $25, and wanting buyers' views of that quotation. *Bar* is selling more freely, and with a more uniform adherence to $60 than has been previously noted. Ton lots of specific sizes are selling at $62·50, and this is another indication of a turn for the better. The Pittsburgh mills have all started, most of them turning in on Monday last. Their best prices named to cash Boston buyers is $2·40, with a 30c. freight, which is equal to $60·50 per ton landed here. There has been a movement among the manufacturers since the end of the strike to adhere closely to the scale of extras on sizes, which if done will force the jobbing markets to advance $3 to $5 per ton. Their is a fair call for Common Sheet Iron at 4½c. for single and 5c. for double. Hardware of all lines is quiet. *Steel* is moving along in a quiet way, with prices quite steady. We quote American Tool, 15c. to 15½c.; American Machinery, 9½c. to 10c.; do. Tires, 6½c. to 7c.; English Tool, 16c. to 17c. *Copper* is somewhat firmer, with an advance of ⅛c. to ¼c. quoting at the close. The spot lots moving are very trivial, but the inquiry exists almost wholly in a speculative way, the highest point marked being a sale of 500,000 pounds for May delivery at 23c. The market ranges, however, at 22½c. to 22¾c. for spot and the first week in May. We quote New Sheathing, 28c.; Bolts and Braziers, 30c.; Yellow Metal Bolts, 28c. *Lead* has had a better tone imparted by the advices abroad, and closes a fraction higher, quoting Foreign, 6¾c., gold. Domestic, 5⅝c.; Sheet and Pipe, 9c., currency; Tin Lined Pipe, 16½c.; Bar Lead, 9c., less usual trade or 10 per cent. discount. *Spelter* is in fair request at $7·30, gold, for Sicilian, and 6½c., currency, for Domestic. *Tin* is dull and easy for Pig, and lower for Plates. We quote Straits, 20c.; Banca, 24½c.; Refined English, 19¾c., gold. Plates are active; we quote Charcoal, I C., $9·50 to $10; Coke, $7·75 to $8; and Terne at $8·50 to $11, gold.

## BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, South Charles and Lombard streets, report us the following prices under date of April 27: Trade continues ruling much as reported in our last, and that vivacity usually noticeable and incident to the season is still wanting to give to business its accustomed activity. We quote the market quiet with unaltered list.

AMERICAN REFINED BAR IRON.

| | |
|---|---|
| 1 to 6 wide by ⅜ to 1 thick.. ; 1 to 4¾ wide by 1½ to 2 thick ; Round and square, ordinary sizes, from | 2·6-10 to 2 7-10c. ₽ lb. |
| ⅜ to 2 inclusive ..... | 2·6-10 to 2 7-10c. " |
| Hoop Iron, 1½ wide and upward | 4¼ to 4¾c. " |
| Band Iron, from 1¾ to 4 in. wide | 3¾ to 3¾c. " |
| Horse Shoe Iron ⅝ to 1 wide by ⅜ to ⅝ thick..... | 4 to 4¼c. " |
| Norway Nail Rods..... | 6¾ to 7c. " |
| Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes..... | 15½ to 16c. " |
| Machinery Steel..... | 11 to 11½c. " |
| Cast Spring Steel..... | 10 to 10½c. " |
| Homogeneous Steel Plate..... | 10½c. " |
| Perkins' Horse Shoes, per keg of 100 lbs,..... | $5·62½ |
| " Mule Shoes " " ..... | 6·62½ |

Common Horse Nails, from 14c. to 18c. per pound.

| | | | | | |
|---|---|---|---|---|---|
| | 10 | 9 | 8 | 7 | 6 |
| Putnam Horse Nails.. | 23 | 24 | 25 | 26 | 28c. per ₽. |
| | 10 | 9 | 8 | 7 | 6 |
| Globe Horse Nails... | 23 | 24 | 25 | 26 | 28c. per ₽. |

R. R. Spikes.....5½ by 9-16 at 3c to 3¾c. per lb.

Messrs. R. C. HOFFMAN & Co., Iron and commission merchants, Nos. 23 and 25 South Frederick street, report the Pig Iron market as follows, under date of April 27: We have no change to make in our quotations since last report. Market dull and unsatisfactory. We quote:

| | |
|---|---|
| Baltimore Charcoal..... | $33·00 @ 36·00 |
| Virginia " ..... | 30·00 @ 35·00 |
| Anthracite No. 1..... | 27·00 @ 28·00 |
| " No. 2..... | 26·00 @ 27·00 |
| " No. 3..... | 23·00 @ 25·00 |
| White and Mottled... ... ..... | 20·00 @ 23·00 |

## RICHMOND.

ASA SNYDER, Iron Merchant and Furnace Agent, Richmond, Va., writes as follows under date of April 26: Quotations the same as last week. Favorite brands of Car Wheel Iron are scarce. Inquiry much greater than at any period since the year opened.

| | |
|---|---|
| No. 1 and 2, Car Wheel Irons..... | $30·00 @ 35·00 |
| No. 3 and 4, " " ..... | 29·00 @ 33·00 |
| No. 5 and 6, " " ..... | 28·00 @ 32·00 |
| Virginia Anthracite, No. 1 ex..... | 29·00 @ 30·00 |
| " No. 2 ex..... | 27·00 @ 28·00 |
| " Coke, No. 1 ex..... | 27·00 @ 28·00 |
| " " No. 2 ex..... | 26·00 @ 27·00 |

## FOREIGN.

### FRANCE.

*(Moniteur des Interets Materiels.)*

PARIS, April 11, 1875.—*Metals.*—Nothing of special interest has occurred during the week in the European metal markets; transactions have remained on but a limited scale, and quotations have undergone little change. *Copper* has been tolerably firm in the London market, consequent upon the moderate charters on the West Coast of but 1700 tons for the latter part of March. The demand for India has, meanwhile, subsided, but the domestic requirements of the United Kingdom are of a more urgent nature, while speculation still keeps aloof. As it is, the position of the metal is a fair one, greater buoyancy may soon arise, the more so as consumption has been making satisfactory headway, and as stocks are known to be light in the manufacturing districts. We are unaltered at Paris, and quote deliverable at Havre: Chili Bars, 212·50 francs; Common ditto, 208·50; Ingots, 220; English Tough Cake, 217·50; and pure Corocoro Ore, 212·50. At Havre the metal is flat, first brands Chili, 211·25 to 212·50; good current ditto, 210; and Lota and Urmeneta, 207·50 the 100 kilos. At Marseilles Copper is quiet and altogether inactive on the basis of 215 francs, Refined Ingots. *Tin.*—The downward reaction which manifested itself toward the close of last week has made no further headway; there is a little more firmness, but if we are destined to see higher prices, it is evident, from present appearances, that no very rapid advance need be expected, speculators for a rise having been scared. We learn by telegraph from Holland that the metal lacks activity, the few sales effected being at 51⅛ guilders for Banca, and between 49¾ and 50⅛ Billiton, to arrive, the latter at 49¾. Here, at Paris, little transpires, and the tendency, if anything, is toward lower figures. Banca, deliverable at either Havre or Paris, 242·50; Straits, 232·50; and English at Havre or Rouen, 232·50. At Marseilles, on the other hand, there is a well sustained market on the basis of 235 francs, Straits and Billiton. *Lead.*—A better feeling and a 5/ per ton advance at London have to be noted in this article, due to the approach of the active season, as well as to the circumstance that stocks in the hands of consumers are light. There being little or no speculation, this metal is now handed over to the ordinary influences of supply and demand, and at the decline which has taken place since January 1 it inspires confidence. Still we are extremely quiet here, and withall, weak. French, deliverable here, 53 to 53·50; Spanish at Havre, 53 to 53·50; English, 52·50; and Belgian and German 53·50 to 53 francs. Spanish, at Havre, is procurable at 51·50. The arrivals at Havre are ample, while the orders that are being received are but moderate. The same relates to Marseilles, where Argentiferous Spanish fetches but 49 francs, three months, and Soft Refined 48·75 to 49. Very little transpires in *Spelter*, the dealings at London being but light. Here we have slightly declined, and Silesian, deliverable at Havre, can be got at 60; other good brands, deliverable anywhere, 59·50. The nominal quotation at Havre remains 61·50 the 100 kilos. Marseilles steady, without change. *Iron.*—We have now reached the season of the year when business ought to be active, but there remains much to be wished for in this respect. Trade, on the whole, is slack, but there are exceptions, and some favored works are getting on satisfactorily. Paris is firm, and so is the Champagne region. The Ardennes are steady at 115 francs for Charcoal Pig; the Rhone basin is slightly looking up. What there is perceptible of activity anywhere is more exclusively in railroad material, and, to some extent, in the architectural Iron trade. The great furnaces and foundries, on the contrary, are not overloaded with work. *Coal* has remained dull, and in some instances even a decline has been reported. Not much has transpired in our own market, where English and German Coal has appeared at moderate rates.

### BELGIUM.

*(Revue Universelle).*

BRUSSELS, April 11, 1875.—*Iron.*—According to the views of most of our Iron masters, not much can be expected of this year's summer campaign. Whether it is that Steel has begun to seriously supersede Iron in many quarters is not easily determined, but it is undeniable that the consumption of Iron has decreased very much, not only in Belgium, but everywhere else beside. One thing is admitted on all hands, that twice as much Iron would be produced than the world can consume, if the works of England, France, Belgium and Austria alone were in full blast. Only such works as are able to turn out good quality at a moderate cost can hold their own in the long run. Our most serious competitors are the English. Their methods of manufacture should, therefore, be closely studied by us, in doing which we shall discover where our inferiority lies, and how we can overcome the drawbacks that impede Belgian progress in the Iron branch. Business, meanwhile, is languid, but we are glad to say the Belgian government is again coming to the rescue, and will, without delay, invite tenders for 400 Coal freight cars for the State railroads. There is, furthermore, to be an important opening of tenders at Prague, in Bohemia, Austria, on the 30th instant; also, for rolling stock; and at Madrid for the Ciudad Real—Badajoz line of Spanish railways for 800 tons rails, the same date. *Coal* is at yet quite irregular; our companies are advised by their well wishers to lower prices, but can apparently arrive at no resolution on the subject. And yet, as the strikes in England will, in all likelihood, now come to a speedy termination on the basis of a reduced scale of wages, that country will be in a position to impart increased activity to its export of Coal; there seems to be no remedy, therefore, but a reduction in the price of the Belgian product, and this with all the more reason as, beside English Coal our manufacturers have that of the Ruhr country ready at hand.

### GERMANY.

*(Borsenhalle.)*

HAMBURG, April 10, 1875.—*Copper.*—The market has been firmer. Here Drontheim is quoted 94 marks, and Lake Superior American, 106. At Stettin the metal commands 105. *Tin* has been inactive here, with sales of but 100 slabs Banca at 98 per pound. We quote Banca, 93 to 102; English Common, 102 to 104., and ditto Refined, 104 to 106 *Lead.*—The German markets are weak; we quote German, 23·75 to 24·50 marks; English, 25 to 25·50, and Spanish, 24·50 to 25. At Stettin, Spanish is quoted 27 marks, and German, 24. *Spelter.*—This metal is quite firm, but for the want of supply no sales on the spot can be reported. To arrive, Silesian would go at 24 marks.

### HOLLAND.

*(Kosh & Vlierboom.)*

ROTTERDAM, April 13, 1875.—*Tin.*—Since the commencement of the month the market has been quiet, and prices have been barely sustained, with trifling sales, at 51¼ guilders Banca, spot and May auction, and 49⅛ Billiton, spot and afloat. The tendency of the market is a dull one, and a further giving way of values not improbable. Comparing the value of Banca Tin with what it was on the 1st of January, 1875, and the two preceding half years, we find that it was then quoted 57¼, against 58¼ July 1, 1874, and 70¼ January 1, 1874; in other words the decline has been 27 per cent. since Jan. 1, 1874.

### EAST INDIES.

*(Aitken, Spence & Co.)*

COLOMBO, Ceylon, March 18, 1875.—*Plumbago.*—We have no change to report either in demand or prices. The Egbert sailed on the 6th instant, and the Umgene will follow this week direct. Export to the United States from Colombo and Galle, since Oct. 1, 12,143; to the United Kingdom, 35,156, and to the Continent of Europe, 1448; together, 49,747 cwts. against 81,073, 68,197 and 56,930 in 1874 and 1872. Exchange has tended downward, and may now be quoted 1/10¼ to 1/10⅝, 6 months' sight, London.

*(Gilfillan, Wood & Co.)*

SINGAPORE, March 10, 1875.—*Tin.*—There have been considerable fluctuations during the past fortnight. It declined to $23·15 per picul, subsequently rallied to $23·62½c. and at the closing is dull at $23·35. A fair business has been done in the early part of the fortnight, but latterly few transactions are reported. The New York berth is vacant, no fixtures having been made since the Jupiter T. and Kelso cleared. The Huddersfield has arrived, and is loading for Boston. For the same destination the Esperance, 273 tons register, and John Clark, 1709 tons register, have been chartered on secret terms. The Jupiter T., for New York, took 4167 piculs tin, and the Kelso 2186. Total shipments to the United States since January 1, two months, 17,911 piculs, against 8892 in 1874, 5877 in 1873, 9048 in 1872, 7226 in 1871, and 2155 in 1870. Exchange inactive at 4/2⅝, 4 2¾ per dollar.

*(Sandilands, Buttery & Co.)*

PENANG, March 12, 1875.—*Tin.*—The advices from the London market continuing unfavorable, the price has receded here to $23 per picul, which is the closing value, with sellers, but no further buyers at the moment. A moderate business has been done for England during the fortnight. There has been no demand for China. The supplies from Junk Ceylon and Larcte have been exceedingly small, the production being curtailed, owing to the want of rain, and also to the low price now current here. Exchange unaltered at 4/2⅝.

*(Dummler & Co.)*

BATAVIA (Java), March 4, 1875.—*Tin.*—Of this metal 10,036 piculs were sold here by auction on the 8th ultimo, and averaged 59·08 guilders per picul, equal to £87. 9/ per ton, free on board, but exclusive of insurance and freight. The next sale will be held on Monday, the 12th April, and will comprise 9000 piculs. *Coal* is quite nominal, no sales of either Australian or English having transpired. The demand is languid. Exchange unsteady and weak at 11·65 guilders per pound sterling, 6 months' sight.

# Our English Letter.

## Review of the British Iron, Steel, Metal and Hardware Trades.

*(From our Regular Correspondent.)*

SHEFFIELD, ENG., April 12, 1875.

THE SOUTH WALES STRIKE

appears to be nearing its termination. Already glimmerings of light appear to have entered the minds of the men, and it is even likely that the dispute may be brought to an end before another week sets in. The hope may, of course, be delusive, but there is a general expectation that both sides are growing tired of the weary fighting, and that the men would be glad to resume their customary work on anything like reasonable terms. On Saturday a mass meeting of about 3000 miners, held at Aberdare, arrived at the sagacious conclusion that a joint mass meeting of the men in the Rhondda and Aberdare valleys should be held to-morrow (Tuesday), "for the purpose of considering the desirability of appointing three workmen to confer with three masters, with full power to arrive at a decision by which the men agree to be bound." This resolve has a better look than anything in connection with the strike which has taken place recently. Mr. Menalaus has closed the Dowlais Iron Works, and says that, under any circumstances, they will not be reopened until coal is much cheaper and wages a good deal lower. As a further index of his determination, he has advised his iron workers to get work elsewhere.

THE STATE OF TRADE

is not appreciably different from what it has been for many dull plodding weeks of late. The various quarterly meetings of iron masters have been held at Middlesboro', Hawley, Wolverhampton and Birmingham, respectively, but they have been merely formal gatherings, so far as the question of prices has been concerned, and have not been, consequently, of very great interest. You are already aware of the fact that no alteration has been made in the official list prices of the best houses, but I may add that in Staffordshire, as well as in Yorkshire, the secondary firms are making no secret whatever about lowering their quotations, and have already done so in order to compete successfully with each other. As a matter of fact, they have put down prices by 10/ to £1 per ton, net.

EXPORTS DURING MARCH.

The Board of Trade returns showing the quantities and values of our exports during the month ending March 31, have just been issued, and are, so far as hardwares and cutlery are dealt with, of a more satisfactory nature than were the figures relating to the previous month. In looking over the tabular returns annexed hereto, it will readily be observed that we have supplied less cutlery and fewer hardware goods to Russia, Germany, Holland, Spain, the United States, the Argentine Republic, British India, and "other countries;" but that, on the other hand, there have been considerably augmented shipments to France, the Spanish West India Islands, Brazil, Australia and British North America. In the case of British North America the increase is astonishingly large, being £57,611 against £11,859 in March, 1874. In respect of the iron and steel exports, there appears to have been a falling off of 20,014 tons in quantity, and £1,423,080 in value in the past quarter compared with the first three months of 1874. Below are details:

COAL, COKE, &c.

| | Month ended 31st March. 1874. Quantity. | Value. | 1875. Quantity. | Value. |
|---|---|---|---|---|
| To | Tons. | £ | Tons. | £ |
| Russia..... | 24,328 | 22,355 | 13,611 | 9,685 |
| Sweden and Norway. ..... | 91,902 | 87,940 | 31,086 | 20,371 |
| Denmark..... | 75,010 | 67,606 | 18,682 | 12,113 |
| Germany..... | 177,560 | 157,438 | 97,880 | 60,218 |
| Holland..... | 28,584 | 28,017 | 20,981 | 12,871 |
| France..... | 188,890 | 169,216 | 231,859 | 147,682 |
| Spain and Canaries..... | 66,002 | 74,646 | 48,487 | 41,675 |
| Italy..... | 86,744 | 82,886 | 82,846 | 58,131 |
| Turkey..... | 35,761 | 34,953 | 13,577 | 11,370 |
| Egypt ..... | 56,891 | 59,495 | 35,850 | 28,422 |
| Brazil ..... | 42,854 | 47,103 | 24,376 | 19 352 |
| Malta..... | 18,781 | 19,371 | 10,092 | 7,700 |
| British India. .. | 27,433 | 28,278 | 32,287 | 27,486 |
| Other Countries. | 208,746 | 219,794 | 223,029 | 176,412 |
| Total..... | 1,129,470 | 1,099,098 | 893,752 | 633,488 |

| | Three Months Ended 31st March, 1874 Quantity. | Value. | 1875 Quantity | Value. |
|---|---|---|---|---|
| To | Tons. | £ | Tons. | £ |
| Russia..... | 54,051 | 53,902 | 29,315 | 22,361 |
| Sweden and Norway..... | 136,287 | 130,217 | 92,924 | 61,858 |
| Denmark..... | 143,472 | 134,832 | 86,079 | 60,230 |
| Germany..... | 292,468 | 268,018 | 198.188 | 125,232 |
| Holland... ..... | 65,595 | 63,180 | 53,986 | 36,706 |
| France..... | 610,713 | 564,519 | 611,764 | 402,261 |
| Spain and Canaries..... | 198,582 | 224,336 | 153,576 | 131,419 |
| Italy ..... | 231,851 | 231,050 | 190,004 | 137,682 |
| Turkey..... | 79,427 | 79,145 | 38,974 | 31,344 |
| Egypt..... | 159,109 | 167,354 | 112,362 | 93,319 |
| Brazil..... | 94,835 | 105.069 | 64,037 | 57,779 |
| Malta ..... | 86,908 | 93,971 | 29,492 | 22,051 |
| British India.... | 95,206 | 99,298 | 111,277 | 90,412 |
| Other Countries. | 648,076 | 684,706 | 674,465 | 518,981 |
| Total .....2,896,580 | | 2,899,417 | 2,446,443 | 1,791,624 |

HARDWARE AND CUTLERY.

| | Month ended 31st March. 1874. | 1875. | Three months ended 31st March. 1874. | 1875. |
|---|---|---|---|---|
| To | | | | |
| Russia..... | 2,523 | 1,214 | 11,176 | 8,158 |
| Germany..... | 20,872 | 22,431 | 64,568 | 51,619 |
| Holland.. ... ..... | 8,674 | 8,070 | 23,779 | 21,920 |
| France..... | 12,193 | 12,703 | 30,978 | 35,312 |
| Spain and Canaries | 8,319 | 6,618 | 24,412 | 22,795 |
| United States..... | 65,234 | 60,066 | 179,483 | 166,830 |
| Spanish and W. I. Islands..... | 5,034 | 6,236 | 10,787 | 17,006 |
| Brazil..... | 21,966 | 27,134 | 64,467 | 83,970 |
| Argentine Republic | 7,305 | 9,025 | 31,457 | 21,560 |
| British N. America | 9,353 | 25,556 | 11,859 | 57,611 |
| British India... .. | 21,819 | 24,598 | 74,549 | 61,595 |
| Australia..... | 44,786 | 58,441 | 133,481 | 169,087 |
| Other countries.. | 113,887 | 92,384 | 330,109 | 274,511 |
| Total..... | 341,970 | 354,476 | 991,125 | 991,974 |

IRON AND STEEL.

| | Three months ended 31st March. 1874. Quantity. Tons. | Value. £ | 1875. Quantity. Tons. | Value. £ |
|---|---|---|---|---|
| Pig..... | 141,768 | 815,245 | 165,613 | 682,589 |
| Bar, Rod, etc. | 54,064 | 707,478 | 57,058 | 604,524 |
| Railroad..... | 159,303 | 2,133,514 | 102,626 | 1,057,135 |
| Wire..... | 6,707 | 153,599 | 11,610 | 209,981 |
| Boil'r & Arm'r plate, &c.... | 31,736 | 608,424 | 43,205 | 727,010 |
| Tin Plates.... | 34,872 | 1,072,636 | 37,342 | 1,086,465 |
| Cast or Wrt.. | 52,920 | 1,096,491 | 44,693 | 906,370 |
| Old, for Remanufactr'e | 3,924 | 26,739 | 2,804 | 15,018 |
| Unwrt. Steel. | 6,446 | 258,031 | 6,404 | 234,200 |
| Manfact'res of Iron or Steel. | 1,843 | 149,188 | 2,314 | 175,033 |
| Total..... | 493,583 | 7,021,345 | 473,569 | 5,698,265 |

| | Three months of 1874. Quantities. | 1875. | Three months of 1874. Values. | 1875. |
|---|---|---|---|---|
| Copper, unwrought, Cwts..... | 45,242 | 47,022 | £205,323 | £212,626 |
| Copper, wrt., Cwts. | 59,846 | 58,843 | 270,405 | 284,842 |
| Mixed yellow metal sheathing. Cwts.. | 56,350 | 61,521 | 237,949 | 248,115 |
| Lead, pig rolled, &c, tons..... | 8,490 | 6,402 | 205,295 | 153,579 |
| MACHINERY. | | | | |
| Steam engines..... | .... | .... | 686,080 | 546,842 |
| Other kinds..... | .... | .... | 1,410,704 | 1,401,380 |
| Telegraph wire and apparatus..... | .... | .... | 230,430 | 227,818 |
| Tin, unwrt., Cwts.. | 42,793 | 27,447 | 247,822 | 134,224 |

The imports of ores, etc., were as under:

| | Quantities. 1874. | 1875. | Values. 1874. | 1875. |
|---|---|---|---|---|
| Copper ore, tons.. | 12,191 | 8,095 | £189,946 | £119,016 |
| " regulus, tons | 6,726 | 9,347 | 279,233 | 368,329 |
| Iron bars, tons... | 11,233 | 7,459 | 167,042 | 110,531 |
| Iron, manufactr'd, cwt..... | 244,934 | 234,112 | 277,822 | 296,957 |
| Steel, unwrt., tons | 983 | 1,286 | 18,568 | 20,328 |
| Tin, cwts..... | 88,992 | 100,319 | 214,350 | 461,513 |
| Lead, pig & sheet, tons..... | 16,965 | 19,745 | 416,219 | 457,827 |

THE SCOTCH PIG IRON TRADE.

The Scotch pig iron market has been continuously weak since the date of my last report, and not only have warrants declined in price, but several makers' brands have receded a couple of shillings or so per ton. Warrants are now about 69/6 per ton, with a clearly weak tendency. Shipments, however, have been steadily maintained, and the total for last week shows a clear increase of nearly 900 tons over the figures for the corresponding period of last year. Connal's stores now contain 29,400 tons, against 35,696 at the same date in 1874. Ballast pig is still held at 55/, delivered alongside Glasgow to New York freights are, as heretofore, 7/6, and Boston, 12/6.

Writing on the evening of April 9th, Messrs. James Watson & Co., Glasgow and Liverpool, said: "The market for Scotch pig iron has suffered a further decline this week, and makers have intimated a reduction in their quotations. The opening price on Monday was 70/, and the lowest point touched 68/9 on Wednesday, closing to-day buyers 69/6, sellers 69/7½. Shipments last week were 11,180 tons, against 10,238 tons in the corresponding week of 1874."

| | No. 1. | No. 3. |
|---|---|---|
| G. M. B., at Glasgow..... | 71/ | 69/ |
| Gartsherrie, " ..... | 77/ | 73/6 |
| Coltness, " ..... | 80/6 | 72/6 |
| Summerlee, " ..... | 78/6 | 71/6 |
| Langloan, " ..... | 78/6 | 72/6 |
| Carnbroe, " ..... | 75/ | 71/ |
| Calder, at Port Dundas ..... | 78/6 | 73/6 |
| Glengarnock, at Ardrossan..... | 77/ | 71/ |
| Eglinton, " ..... | 70/ | 68/ |
| Dalmellington, " ..... | 70/ | 68/ |
| Shotts, at Leith..... | 78/ | 72/6 |
| Kinneil, at Boness..... ..... | 75/6 | 70/6 |

Messrs. Wm. Colvin & Co., Glasgow, April 13, report: "The warrant market has been steady during the past week, the price fluctuating between 68/9 and 69/7½, cash. The closing prices this afternoon are buyers, 68/9; sellers, 69/. Makers' iron is again easier, as will be seen from the undernoted quotations."

| | Deliverable alongside. No. 1. | No. 3. |
|---|---|---|
| G. M. B., at Glasgow..... | 71/ @ 72/ | 69/ @70/ |
| Gartsherrie " ..... | 76/ | 73/ |
| Coltness, " ..... | 78/ | 71/ |
| Summerlee, " ..... | 78/ | 71/ |
| Langloan, " ..... | 78/ | 71/ |
| Carnbroe, " ..... | 74/ | 70/ |
| Monkland " ..... | 71/ | 70/ |
| Clyde " ..... | 72/ | 69/ |
| Govan, at Broomielaw..... | 72/ | 71/ |
| Calder, at Port Dundas..... | 77/6 | 73/ |
| Glengarnock, at Ardrossan..... | 74/6 | 69/6 |
| Eglinton, " ..... | 69/ | 67/ |
| Dalmellington, " ..... | 69/ | 67/ |
| Carron, at Grangemouth, selected... | 77/6 | .. |
| Shotts, at Leith..... | 77/6 | 72/ |
| Kinneil, at Bo'ness..... ..... | 73/6 | 68/ |
| Bar Iron..... | £9. 10/ | |
| Nail Rods..... | £9. 10/ | |

SHIPMENTS.

| | Tons. |
|---|---|
| Week ending April 10, 1875 ..... | 13,914 |
| " April 11, 1874..... | 9,655 |
| Increase..... | 4,259 |
| Total increase for 1875..... | 15,424 |

Messrs. John E. Swan & Bros.' (limited), Glasgow, prices current is as under:

| Glasgow Brands. | Furnaces B'ying, 119 | Furnaces Out 38. | Furnaces Built, 157. | Prices. No. 1. | No. 3. | No. 4 |
|---|---|---|---|---|---|---|
| Gartsherrie..... | 14 | 2 | 16 | 76/6 | 73/6 | .. |
| Coltness..... | 12 | 0 | 12 | 80/ | 71/6 | .. |
| Summerlee..... | 6 | 2 | 8 | 78/ | 71/ | .. |
| Langloan..... | 7 | 1 | 8 | 78/ | 73/ | 73/ |
| Govan..... | 1 | 4 | 5 | 71/6 | 70/ | 73/ |
| Calder..... | 6 | 2 | 8 | 78/ | 71/ | 73/ |
| Shotts { Bess'mer | 5 | 2 | 7 | 90/ | 85/ | .. |
| Shotts { Ordinary | | | | 77/6 | 72/ | .. |
| Carnbroe..... | 4 | 2 | 6 | 75/ | 70/6 | 73/ |
| Wishaw..... | 2 | 1 | 3 | .. | .. | .. |
| Monkland..... | 7 | 2 | 9 | 71/6 | 69/ | 70/ |
| Chapelhall..... | | | | .. | .. | .. |
| Clyde..... | 6 | 0 | 6 | 72/ | 69/ | 72/ |
| Quarter-Clyde... | 4 | 1 | 5 | 71/ | 69/ | 71/ |

*f. o. b. Glasgow, 1/ per ton, extra.

Glasgow Warrants, 3-5 No. 1; 2-5 No. 3, g. m. b, 69/7½.

WEST COAST BRANDS—*f. o. b. Ardrossan.*

| | | | | | | |
|---|---|---|---|---|---|---|
| Glengarnock..... | | 7 | 2 | 9 | 76/6 | 70/6 | 73/ |
| Ardeer..... | | 4 | 1 | 5 | | | |
| Eglinton..... | Brand'd Eglint'n | 6 | 2 | 8 | | | |
| Lugar..... | | 4 | 0 | 4 | 69/ | 67/ | 68/ |
| Muirkirk ..... | | 3 | 0 | 3 | | | |
| Portland..... | | 3 | 3 | 6 | | | |
| Dalmellington..... | | 6 | 2 | 8 | 69/ | 67/ | 69/ |

EAST COAST BRANDS—*f. o. b. in the Forth.*

| | | | | | | |
|---|---|---|---|---|---|---|
| Kinne

their development is thus for a time returning no interest.

The question of lowering the wages of the miners proper in this district having been satisfactorily disposed of, the South Yorkshire and North Derbyshire coal owners have taken into consideration the question of lowering the rate of payment at present accorded to the topmen and other aboveground operatives at their pits. The amount of the "drop" will in these cases average about 5 per cent., and will be arranged by each colliery proprietor with his own men, inasmuch as the existing scale of remuneration is not uniform at all the pits. The alteration will probably come into operation before the end of April, and will affect several thousand men of the classes named, who are, it may be said, united in an organization of their own—having no connection with the Miners' Association—under the title of the "South Yorkshire Colliery Operatives' Association." It is not supposed that there will be any serious opposition to the reduction, although there are rumors of intended resistance in one or two isolated cases—chiefly in Derbyshire.

Pig iron is in pretty fair request, chiefly for foundry and good forge purposes. A good local forge iron is being sold at 76/, or from that to 78/ per ton, and some Derbyshire producers offer it at rather less money. The hematite pig iron makers are carefully firm in their quotations, samples of which are these: Maryport "Hematite," No. 3, 90/; No. 4, 87/; No. 5, mottled and white, 87/; "Bessemer," No. 1, 92/6; No. 2, 90/; and No. 3, 87/6 per ton; Millom "Bessemer," No. 1, 90/; No. 2, 87/6; and No. 3, 85/; "Ordinary," No. 3, 85/; No. 4, 84/; No. 5, 90/; mottled, 95/; and white, 90/ per ton, with 2½ per cent. off for cash.

There is no material alteration to record in the condition of the other leading heavy trades.

The dispute in the spring knife trade between Joseph Rodgers & Sons and their outworkers in the penknife department continues, the workmen being determined not to submit to any reduction in the amount of their file money. A similar dispute, but on a larger scale, took place last year, and was referred to the arbitration of Mr. Tom Hughes, M. P., who decided that the men were fairly entitled to the "file" money. This payment is in reality a commutation, the firm having agreed in the year 1810 to allow a money consideration in lieu of supplying the files themselves to the men. The iron workers are supporting their outdoor brethern, lest they also should be called upon to give up their ancient allowance. Many of the men who came out on strike have already obtained work in other quarters. Hafting materials are dear. Advices from the West Coast of Africa state that a good lot of ivory had just been put for sale and withdrawn at 8/6 per pound.

NEW AMERICAN IRON WORKS

are, I hear, about to be erected within 50 miles from New York, in order to work what is pretty widely known as the Henderson process. Mr. A. Griffiths, at present manager of the Charlton Iron Works (Limited), Sheffield, will leave this country by the Cunard boat sailing from Liverpool on April 27th, in order to superintend the erection of the works and machinery, and will then act as manager of the concern. Mr. Griffiths is a shrewd, practical man, and his gain to the United States iron trade will hardly balance what we lose. I do not need to bespeak welcome for Mr. Griffiths apart from the consideration that he is already well known to some of your leading iron men.

SOUTH STAFFORDSHIRE AND BIRMINGHAM.

Neither at Wolverhampton nor Birmingham did the quarterly meetings result in changed quotations or enlarged business. Great complaints were made as to the keen competition experienced by the Canadian exporters from your manufacturers, it being alleged that the latter are flooding the Dominion with iron and iron goods, to be sold at any price they will realize owing to the dullness of your own trade. Current prices in Staffordshire and the Birmingham district are now as under: Hot blast native all mine pig, £5; cold blast, £6; and gray forge, £4; Lilleshall cold blast, £6. 10/; cinder pigs, £3 to £3. 1/9; best brands of bar iron, £11, including such firms as Thorneycrofts, Barrows, Bagnalls, &c., with 12/6 for Earl Dudley's; good medium marked bars, £10 to £10. 10/; common bars, £9. 5/; sheets (singles), £12 to £14; hoops, £11 to £12; nail rods, £9. 10/ to £11. 10/; and strips, £10. 15/; special Wilden sheets (20 gauge), B., £18; B. B., £19; B. B. B., £20. 10/; B. charcoal, £27. 10/; E. B. charcoal, £29. 10/; Severn, £15. Crowther & Brothers (Stour Vale Works) black and charcoal sheets and deep stamping plates (single), £17. 10/, £19, £21, £23 and £25 per ton at the works; ordinary ship plates, £11 to £12; girder plates, £11 to £14; cable iron, £11 to £12; and wrought iron girders, £17 to £19 per ton. The hardware industries of the Birmingham district are tolerably well employed, and have fairly good prospects before them. Cut nails are declared 10/ per ton lower, otherwise the inauguration of the new quarters has not been productive of any material change.

SOUTH WALES

is, as yet, unproductive of any change worth naming specially. It is stated as a remarkable fact that not a single order for iron was given out in the principality during the whole of the first quarter of the year. It is further persistently rumored that even if the miners' strike be disposed of the iron works will not resume until wages have been lowered 30 or 40 per cent. This, of course, is a fact yet to be demonstrated. The tin plate works are well employed, and prices have slightly stiffened. A reduction of make is also being adopted in order to send quotations up.

THE METAL MARKETS

have been moderately active, copper and lead being clearly firmer than a week back. Tin has been active. On Friday 70 tons Straits were sold in London at £86 to £86. 10/ cash, £85. 10/ for June and July delivery and April and May shipments. Australian tin is held at £85. 10/ to £86 for prompt cash. Same day 50 tons of Chili Bars (copper) were sold at £81. 10/ cash. The *Mining Journal* remarks:—"*Copper.*—Although there was no important change in the position of the copper market to chronicle last week, yet the tendency was to somewhat increased firmness; this has continued to be the characteristic feature of the week now closing. Each day has added its quota to the firmness of the market, and prices show an advance upon those current at the beginning of the week. To-day the market for Chili bars presents no variation, being quiet, but steady. Sellers are quoting yesterday's prices, but as Birmingham buyers declined to afford substantial support to the market, there not being demand sufficient to warrant their doing so, business to-day has been somewhat restricted. Yellow metal is firmly held at 7⅞; English tough, £86 to £87; best select, £87 to £88; India 4 by 4 sheets, £93; strong sheets, £94. It is questionable whether in the present condition of the market anything more than a limited amount of business could be effected at the prices quoted for manufactured or tough copper, and as the demand for Chili produce strengthens, firmness is necessarily imparted to other varieties, notwithstanding the continued dullness and lack of general demand. The requirements for the Indian market seem to be supplied for the moment, and orders for shipment are not so numerous, nor of sufficient importance to impart stability to prices, but the home demand is fair, and the inquiry for Chili bars is based not upon any speculative movement, but upon the requirements of consumers. This is a good sign, and should it continue, speculation is pretty sure to afford additional support to the market. *Lead.*—The market has been firmly maintained throughout the week, and though no change has taken place in price, sellers are only disposed to part with limited quantities at current quotations. Good soft English pig is obtainable at £21 and £21. 5/, and business is reported in Spanish, without silver, at £20. 10/. *Spelter.*—English hard has realized £18 in Liverpool. Silesian rules at about £23 and £23. 10/. *Zinc.*—London rolled has realized £25. 5/ and £25. 10/. *Quicksilver.* There is no change to report in the position of this metal, which still rules at £15 per flask. *Tin.*—The market has been quiet during the week. Actual business has been limited, and quotations have undergone only trifling alterations. Straits tin, upon usual cash terms, is quoted £86. *Tin Plates.*—The market is quiet, and makers are disposed to submit to some slight concessions in price rather than allow orders to go past them."

Messrs. J. Berger Spence & Co.'s report today says that *Copper* has been moderately active at higher prices. The charters for the last half month of March were 1700 tons, and of these 1000 tons of bars and 450 tons of regulus for the United Kingdom. *Tin* is somewhat steadier, though still far from firm. Business has been rather restricted during the week. The price of lead has been rendered firmer by the good demand which the late reduction had called forth. *Spelter* is a shade weaker, and evidently on the point of undergoing another reduction of value.

Latest Liverpool prices are:

*Iron: f. o. b. in Liverpool, per ton.*

| | £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|
| Merchant bar | 8 | 12 | 6 | @ | 8 | 15 | 0 |
| Merchant bar, in Wales | 8 | 2 | 6 | @ | 8 | 5 | 0 |
| Staffordshire | 9 | 0 | 0 | @ | 11 | 15 | 0 |
| Hoop | 10 | 10 | 0 | @ | 11 | 10 | 0 |
| Sheet | 12 | 5 | 0 | @ | 13 | 0 | 0 |
| Nail rod | 10 | 0 | 0 | @ | 10 | 10 | 0 |
| Bar, best crown | 9 | 0 | 0 | @ | 9 | 5 | 0 |
| Boiler plates | 12 | 0 | 0 | @ | 13 | 5 | 0 |

*Tin Plates: f. o. b. in Liverpool, per box.*

| | £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|
| Charcoal, I. C. | 1 | 14 | 0 | @ | 1 | 17 | 0 |
| Coke, I. C. | 1 | 7 | 6 | @ | 1 | 8 | 6 |

*Copper: Delivered in Liverpool, per ton.*

| | | |
|---|---|---|
| Bolt and Sheathing | £95 @ | £96 |
| Tile | 88 @ | 00 |
| Tough cake | 90 @ | 00 |
| Best selected | 92 @ | 00 |

## The Austin-Topolovampo Pacific Railway.

A reporter of the Philadelphia *Press* has interviewed Mr. Owens in regard to his Austin-Topolovampo Pacific Railway scheme, which is described by Mr. Owens as follows:

There are 662 iron furnaces in the States east of the Rocky Mountains, capable of producing 4,500,000 tons of pig, valued at $118,000,000 annually, and of employing 66,000 men. My idea is to have a hundred or more of these companies incorporate themselves for the purpose of building the Austin-Topolovampo Pacific. To build this, as has been shown in argument before Congressional committees, $24,000,000 are required. The organization will pledge its properties, *i. e.*, its furnaces, business sites and appurtenances, and with its promissory notes, secured by the said properties, including railroad and franchises, will pay for the labor and material required for constructing the said highway. The promissory notes will not be required to be indorsed, but will be issued in amounts equal to a dollar, and in fractions and multiples thereof, in such forms as to be convenient for current use. They are to run for 12 years, and to be receivable in payment as tariffs (duties) over the road, and as exchanges (dues) for materials, productions and services of the company. Fifty per cent. of the gross earnings of the road are to be destroyed quarterly, and if any remain uncancelled at the end of 12 years they will be redeemed in legal tender money of the United States.

If an individual or a corporation offer promissory notes or promissory currency to run a period of years, and the people are willing to accept them or it, who will say nay, or in what manner has the constitution or the State laws been violated? In accordance to the law now, I believe, the company would simply have to pay a tax of 10 per cent. on the money issued.

It is to be regretted that this promissory highway currency paid out for material and service employed in the construction of the Austin-Topolovampo Pacific, and in exchange received in payment for services rendered by the Austin-Topolovampo Pacific, and the work of the company at their furnaces, will not be legal tenders other than to the company, but this promissory currency may be practically as useful, if the people will give it their confidence, and use it in their current exchanges, and thus would the company show the practical working of the people's money, and the government be forced to pass the legal tender act, and thereby give us a comprehensive and just national monetary system, which would demonetize all metallic, together with individual and corporation, money.

The Union Pacific makes $11,000 gross per mile annually. Its expenses are 44 per cent. of the receipts. It has heavy grades, operates at additional disadvantage and increased expense on account of snow, ice and frost during the winter, and has but a small population along its line. On the Austin-Topolovampo Pacific there are light gradients and long tangents, not any snow, ice or frost, and a large population, except on the Texas plateau. Say the road earns $10,000 per mile annually during the six years following its completion; let us allow 50 per cent. for expenses, and we have $5000 per mile to cancel the company's *promissory currency*. There are 800 miles of road—5000 by 800—$4,000,000 per year, which would cancel the debt in six years and the company would own the road.

As each section, as soon as finished, would have business, this promissory currency, from the first, would be exchangeable for the wares and services of the company at their furnaces, *i. e.*, the laborer on the Austin-Topolovampo Pacific would simply give his labor and skill directly in exchange for the wares and services of the company; or, if he did not want, or it was not convenient for him to exchange directly with the company, he would exchange indirectly through the various railroad companies or hardware merchants who did. When the trains commenced to run, and the lands of the company began to sell, the company would give its services and lands to individuals in exchange for its promissory currency, 5 per cent. less than the other money. This would be the means of bringing the promissory currency quickly into the company's possession, and thus would the debt be more readily cancelled, and the promissory currency kept at par with government legal tenders.

## Ancient Copper Mines in England.

In May, 1874, the miners, in following, by means of galleries, the lines of ore in the copper mines which are now being excavated on Lord Stanley's estate, near Alderley, Cornwall, England, had approached the surface, and it became necessary to dig down from the top. In doing this a number of ancient pits were discovered, varying from 5 to 12 feet in depth. These pits were fortunately noticed by Professor Boyd Dawkins, F. R. S., who found that they contained, among the rubbish with which they are filled up to the surface, a number of rude stones, consisting of the ice-borne boulders of the neighborhood, which had been adapted for use as mining tools. The tools were of different sizes, varying from 4 to 20 pounds in weight, and the forms were also very different, no two being exactly alike. The ancient miners appear to have adapted each stone to the use for which its natural ice-worn surface best fitted it, without attempting to trim it into any particular shape. The grooves cut around them for the reception of the withy, however, show the several purposes for which they were employed, and enable a rough classification to be made. They consist of: 1. Wedge shaped tools, with a groove round the middle, evidently intended to be fitted into a crevice of a rock, and struck on the broad end with another stone. 2. Oval flattish boulders, with a groove round the middle, adapted to be used as hammers. 3. Picks pointed at one end, and having, in addition to the groove round the middle, or near the broad end, another over the back, along which another withy was fastened so as to keep the point of the pick in the required position and prevent its swerving at the blow. 4. Flat stones, with a notch at each side, which were probably employed to scrape the loose rubbish out of the pit. Many of the points of the picks showed marks of abrasion, and the surfaces of the grooves showed that they were much more recent than those of the ice worn surfaces of the boulders. A set of these tools has been added to Colonel Lane Fox's anthropological collection at Bethnal Green. It appears uncertain what was the metal sought for in these workings, as ores of copper, cobalt, lead, iron and manganese are found in and about the pits. There is less than five per cent. of copper in the ores as they are now worked, and this leads Mr. Boyd Dawkins to conjecture that the pits may be of the bronze age, when this metal was of great value, and eagerly sought for throughout Europe. No certain evidence of date has been discovered, but the entire absence of metal implements, and the rude appearance of the workings, suggest the likelihood of a pre-historic age. Stone implements of similar forms, having groves for the handles, have been found in ancient copper mines at Killarney, in Anglesea, in Spain and Portugal, and on the borders of Lake Superior, and the present discovery probably adds another to the list of places in which implements of this particular type have been found in association with early metallurgic art.

## Mining Methods.

A San Francisco journal claims that the best worked mines of the world are the mines of California and Nevada. It says that while we send our young men to Germany to study mining engineering, there is no such mining engineering in Germany as that on the Comstock lode—no mines in which the mechanical appliances are so ingenious and effective. The *Post* bases its remarks on the statement of a Comstock mining engineer who recently traveled through Germany inspecting the mines. He says that in the deepest mines of the world—those in Bohemia—the hoisting apparatus consisted merely of open tubs, and the hoisting machinery was so poor and in such condition that, though used to going down into the deepest levels of the Comstock day after day, he did not dare to descend. He also found that in most of the German mines the men were compelled to walk up and down to the scene of their labors, either going down an incline, or using long parallel stilts, which move up and down alternately about six feet at a time. The mode of ascending and descending on these is to step from one to the other, as each ascends or descends, while a misstep is certain death, not only to the man who misses his hold, but to all below. When the Nevada engineer told the German mining superintendent that in the Comstock the men went down to the lowest levels and came up in two minutes without the slightest exertion, they smiled politely, but incredulously. As with the means of going up and down, so with the mining tools. The American pick, like the American axe, is the best instrument of its kind in the world. With us the pick weighs from four to five pounds; the German pick weighs from nine to ten pounds, and all other mining tools are in proportion. A large percentage of the strength of workmen is thus exhausted without any return, while in our mines it is all devoted to the end in view, and an average's day's work upon the Comstock would seem incredible to the miners of continental Europe. In yield, in extent, in engineering skill, and in the efficiency of the work and mechanical appliances, the *Post* says the Comstock lode is undoubtedly the first mine in the world.

**Strike of Helpers at Wheeling, West Virginia.**—The Wheeling (W. Va.), *Register* of the 24th inst., says: "There is very little news to report in regard to the strike, and we suppose there will not be until the general meeting of nail feeders to be held Saturday afternoon. A dispatch was received yesterday, addressed to the top mill feeders, from the Green Castle, Indiana, feeders, asking for information in regard to the strike, the news of which having been telegraphed all over the country. The Belmont feeders held a meeting Thursday afternoon, on the bank in front of the mill, and the result was about thirty more feeders going out on the strike, making about fifty in all. The Riverside feeders are all out, but the La Belle boys stick to their machines. We understand that a number of the feeders of the Ohio City Nail Mill, at Martin's Ferry, left their machines Thursday afternoon, and it is reported that the balance will go out this (Friday) evening or Saturday morning. The helpers are still out, and the boilers seem as determined as ever not to yield to their demands."

A dspatch from Wheeling, under date of April 26th, says:

At a meeting of nail feeders, of Wheeling, West Va., on Saturday, it was decided that all the feeders in the different mills of the city should strike for three-fifths, and maintain the strike until the price demanded was granted, and all the feeders taken back to their positions. The helpers' strike is also general.

**Preserving Cast Iron from Rust.**—Girders, angle irons, and other similar large masses of iron are often placed in exposed situations, where damp air, steam and acid vapors have access. If the iron be put up in the rough, it very speedily rusts, and, under favoring conditions, the corrosion soon reaches a dangerous point. Contractors generally agree to supply such irons painted in three coats of minium, which, if honestly done, would, to a certain extent, protect the metal; but, as a rule, only one thin coat is applied, and the slightest abrasion exposes the iron. A new and peculiar mode of treating iron is the following: The metal is heated until, if touched with oil or fat, it frizzles, and then is plunged into a vat of mixed oil and grease. This mode of treating cast iron is, therefore, far superior to any "painting," as the oleaginous matter actually penetrates the pores, and prevents oxidation for a very long time, while it does not prevent painting, if desirable, afterward. The best protection for iron is to heat it in vacuo and treat it with paraffine.

In the Bouniard furnace, for making wrought iron or steel from pig, are united the different methods of steel manufacture at present adopted, with the addition of a special arrangement for working and also for the maintenance of the structure. The furnace is a reverberatory one, heated by the Siemens process or by an ordinary fire grate; that portion of the hearth which receives the bath is movable, while the two other portions by which the gases alternately enter and issue are fixed. The central portion of the furnace is mounted on a truck, and gives passage to an ejector composed of a tube covered with fire bricks; through this tube the air enters at a given pressure; it escapes into the bath of pig previously melted in the same or a separate furnace. This forcing of air into the melted pig is for the purpose of refining the metal as in the Bessemer process. A rotary as well as a reciprocating movement is given to the ejector by gearing. The lower portion of the ejector, which is of helicoidal form, gives motion to the bath, so that two operations, refining and puddling, are performed at once, which rapidly transform the pig into steel, at the same time rendering the metal homogeneous. A realization of the expectations with respect to this new furnace will be a progress in the manufacture of iron and steel.

One of the most beautiful methods of ornamentation on pedestals, vases, brackets, pendants, &c., far surpassing silver and other plating, is the mica process. It can be applied to wood, iron, stone or plaster. The mica plates are first cleaned and bleached by fire, boiled in hydrochloric acid, and washed and dried. The material is then finely powdered, sifted and mingled with collodion, which serves as a vehicle for applying the compound with a paint brush. The objects thus prepared can be washed in water, and are not liable to be injured by sulphureted gases or dust. The collodion adheres perfectly to glass, porcelain, wood, metal or *papier mache*. The mica can be easily tinted in different colors, thus adding to the beauty of ornamentation.

Arrangements are about being made for a resumption of the boiler experiments at the Munhall farm, Pittsburgh. On Monday next the work of constructing a new bomb-proof will begin, while new and approved instruments are being constructed for making the necessary observations. The experiments will be conducted under the immediate direction of Prof. Winlock, of Cambridge University, assisted by Prof. Thurston, of the Stevens Institute; J. V. Holmes, of Ohio; and Messrs. Copeland & Robinson of New York. A new boiler, to be used in working the pumps, will be put up in the place of the small one now in use. The experiments are to be conducted on a different plan than the one adopted by General Smith, and one supposed to be productive of better results.

A shipment of 50 tons of charcoal iron has been made by the Round Mountain Iron Company per steamer St. Louis, from Savannah to Liverpool. The shipment brought £7 per ton, and an advance of 10/ to 20/ is anticipated on the next lot exported, as the brand is valuable on account of its chilling properties.

## Iron and Steel.*

BY ADOLF SCHMIDT, PH. D.

*A lecture delivered before the University Club of St. Louis, Mo., on January 13, 1873.

Many in common life use the word "iron" without knowing the exact meaning of it, without knowing what iron really is, and how many different, and how variously qualified substances are embraced by this term. We speak of iron stoves, iron pipes, iron rails, iron wire, etc. Certain experiences, however, teach us how different the materials are of which these objects are made. If we strike a hard blow on a thin edge of a stove, the edge will not give way gradually, but will suddenly break off, and will show a more or less even crystalline, and sometimes brilliant surface of fracture. If, on the contrary, we strike a good nail sidewise, it will give way at the first blow, and bend more and more at each following blow, and often until its ends meet, without even showing a crack; and when after repeated efforts and repeated bending one way and another, we succeed in breaking the nail, we notice a dull and fibrous appearance of the fracture. If we take a knife and try to cut or scratch an ordinary stove with it, our efforts will be in vain; but, with the same knife we may easily chip off small pieces of a nail. All these objects, however, are made of what is generally called iron.

Perhaps many in hearing this, will say: "The difference is easily explained; a stove is made of cast iron, and a nail of wrought iron." This is so, indeed, but if I ask them, what is cast iron, and what is wrought iron, what is the essential difference between the two, what treatment or composition causes the one to be hard and untreatable cast iron, the other soft and flexible wrought iron, not quite so many will be prepared to answer. Finally, going one step further, and drawing steel into consideration, which, though having a differently sounding name, is but another variety of iron, we arrive at a question, that, but a few years ago, was the object of earnest and prolonged dispute between two celebrated and learned members of the French Academy. This fact alone is a proof that these matters are not quite as simple as they appear at first sight.

From this reason, and also because iron is one of the principal, if not the most important material used in all industrial establishments, as well as in most constructions of the engineer and builder, and is therefore an object of general interest, I will, this evening, endeavor to give you an explanation as exact as the present stage of scientific progress will allow, on the question: "What is iron?"

Here, the first thing for us to decide is, whether iron really is iron; that is to say, whether those materials generally called iron in common language do all consist of the matter which the scientist and chemist calls iron, and whether they are all alike in their composition and substance. The just mentioned little experiments exhibiting a striking difference in the qualities of these different materials, seem to indicate the contrary. But might not the difference be caused, perhaps, by a different mechanical treatment only, by merely exterior and physical influences producing different qualities in the same kind of matter; as for instance, water differs from ice and steam, as charcoal differs from graphite and diamond, consisting, nevertheless, essentially of the same matter of the same chemical substance?

In regard to iron the case stands otherwise. The chemist tells the metallurgist "what you call iron, and what the world calls iron, is in all its varieties as wrought iron, cast iron and steel, not really iron, but a chemical compound of iron and carbon, the latter being an essential and indispensable constituent, without which the iron itself is of no practical use nor value." Indeed, the chemical element, iron, without any admixture, is a substance which probably very few of us have ever seen. It does not, and cannot, occur in nature; it can only be produced artificially in the chemist's laboratory. It is, when condensed, a crystalline metal of silver-white color, very soft, tough and flexible. It is, however, of no practical use, because its affinity for oxygen is so great that it oxydizes rapidly when brought in contact with the moist atmospheric air. It forms a chemical compound with the oxygen of the air through a process of slow combustion, the product of which is either black oxide, or, as more generally, red or brown oxide of iron, commonly called "rust." This explains why iron cannot occur in nature as a pure metal, but only in combination with oxygen, and principally in the shape of black, red and brown oxides. These oxides when found in nature are called ores, the black oxide being the magnetite, the red oxide being the hematite, which term includes the specular ore, and the brown hydrated oxide being the limonite. These iron ores are, therefore, nothing else but iron rust formed in nature, and gathered in considerable quantities in certain localities, where they are dug out and used as raw materials in the iron manufacture.

The ores or compounds of iron and oxygen are non-metallic, partly stony, partly earthy, and have none of the valuable qualities of the metallic iron. Such as they are, they cannot be made directly useful for industrial purposes. To make use of the metal they contain, the iron must be separated from the oxygen, and since it cannot well be preserved and used in its pure state, it must be combined, if possible, with some other substance which would not only preserve its valuable metallic properties, but also protect it from rapid reoxidation. Such a substance is carbon; and to my knowledge carbon is, of all chemical elements, the only one capable of producing this double effect. The object of iron industry in general is therefore to separate the iron from the oxygen with which it is combined in nature, and to unite it with a desirable amount of carbon. All the iron and steel produced by this industry, and

used for industrial or constructive purposes—in fact, all the so-called iron we meet with in ordinary life, is in the main a chemical compound of iron and carbon or, to use a shorter expression, a carburet of iron. Happily, carbon is a substance frequently found in nature and easily obtained. It is one of the principal components of almost all organic matter, especially of all plants, from which by the charring process it is obtained as charcoal. It is found on and in the earth in immense quantities in the shape of mineral coal and anthracite. Graphite and diamond are crystallized varieties. All carbon is combustible. When heated to a sufficiently high temperature, it eagerly combines with the oxygen of the air and burns to carbonic oxide gas, or under favorable circumstances to carbonic acid gas, producing in the latter case a very high amount of heat. Carbon, when in the shape of either charcoal or of mineral coal, or of gases, readily combines with metallic iron at a high temperature—for instance, in blast furnaces—thus forming carburets of iron.

I have mentioned before that wrought iron, steel and cast iron, are such compounds, or carburets of iron. This is a solution, in a general way, of the proposed question—"What is Iron?" But it still remains to be told how those three principal kinds of carburets differ from each other exteriorly as well as in their chemical composition, and how the difference in their chemical composition affects their exterior appearance and qualities. I will tell you at once, gentlemen, that the opinion is now generally established that the characteristic difference between wrought iron, steel and cast iron, is due to different amounts of carbon with which a certain quantity of iron is chemically combined. The more carbon a carburet of iron contains, the more it approaches hard cast iron in its qualities; the less it contains, the nearer it stands to soft wrought iron. An intermediate percentage of carbon produces steel, the latter being itself the harder the more carbon it contains. This opinion has hardly ever been doubted as far as it refers to the difference between wrought iron and cast iron. But steel was considered for a long time a quite peculiar substance, the composition and manufacture of which were clad in mystery. The manufacturers themselves, being then but few, did much toward creating this impression, which kept others from applying themselves to the steel manufacture, on account of the mysterious difficulties they expected to encounter. This prejudice, however, gradually vanished with the increase of the demand, and of the manufacture itself, and clearer views seemed to be gaining ground, when suddenly, in 1861, Prof. Fremy, in Paris, surprised the French Academy with the announcement that not a certain percentage of carbon, but that a small amount of nitrogen constituted the real and essential difference between steel and the other carburets of iron. He based his opinion on careful investigations and analyses, which invariably showed steel to contain nitrogen. The fact that cyanides and all kinds of organic matter containing nitrogen were at that time, and are yet to-day, largely used in the manufacture of cast steel, seemed to confirm practically the correctness of his views. Though the academy was at first surprised at the novelty of this discovery, Prof. Caron, on the same day, opposed its correctness, and afterward found that not only most steel, but also most wrought iron and cast iron, contained a perceptible amount of nitrogen. Thus Fremy's discovery, though interesting in itself, could not be used any longer to explain the difference between iron and steel, and after this time, especially through the closer observations made by scientific men on the processes by which steel is made, the opinion that the percentage of carbon only gives to the steel its general characteristic qualities, was firmer and firmer established, and stands unshaken to this day.

The highest amount of carbon with which iron will combine under ordinary circumstances is about five per cent., and the lowest amount sufficient to protect the iron from being too easily oxidized or burnt is about one-fourth per cent.

A carburet of iron containing from one-fourth to one-half per cent. of carbon is wrought iron; a carburet of iron containing from one-half to two per cent. of carbon is steel; and a carburet of iron containing from three to five per cent. of carbon is cast or pig iron.

The following are the most characteristic qualities by which these three materials may be distinguished from each other:

Wrought iron, in both the heated and cold states, is soft, malleable, ductile and very tenacious. When heated, it is easily forgeable and weldable. It is not susceptible of tempering, like steel, and cannot be hardened much by being heated and cooled in water. It is not fusible except at temperatures rarely attainable in furnaces. Its original and natural structure is grainy and coarsely crystalline; the coarse and soft crystals, of which a mass of unworked wrought iron is composed, are, however, drawn in length considerably and forcibly when the iron is hammered or rolled hot, and the iron obtains thereby a fibrous structure. When a cold bar is subjected to a strain tending to tear it asunder, it gives way slowly and gradually, and elongates considerably before it breaks. Breakage occurs under a strain of about 60,000 lbs. on each square inch of section.

Steel is likewise crystalline in its structure, but of smaller and closer grain, and the harder the steel the finer the grain. Steel is, therefore, more dense, solid and elastic than wrought iron, but naturally harder, and much less malleable and ductile when cold. It requires more care, and offers a greater resistance in being forged or rolled; it welds less perfect. Though not near as fusible as cast iron, even large quantities of it can be smelted in furnaces without difficulty at a temperature of about 4000° Fah. Owing to the small size and greater hardness of the crystals composing its mass, it never attains a true fibrous structure. Steel has a greater tensile strength than wrought iron, carrying a load of 80,000 to 150 000 pounds per square inch, but when it breaks, it breaks suddenly, without giving previous notice by any distinctly perceptible elongation. By far the most remarkable property of steel, however, one by which it can easily be distinguished, not only from wrought iron, but from any forgeable material known, is its capacity for receiving different degrees of hardness by tempering.

When a piece of steel is heated and suddenly plunged into water, or into any other fluid having a temperature lower than the steel, it gets very hard, not only on the surface, but to a considerable depth, and if the piece is thin, it hardens almost uniformly all through. It gets the harder the greater an amount of carbon it contains, and the higher the piece is heated and the lower the temperature of the fluid. It becomes simultaneously more stiff and brittle and more perfectly elastic. This manipulation is called the hardening of steel.

When a piece of steel thus hardened is afterward heated again slowly, the effect of the hardening process gradually disappears, and the steel returns to its original and natural condition. But if this proceeding of slowly heating hardened steel is suddenly interrupted by plunging the steel again into the cold fluid, the steel retains that degree of hardness which it has in the moment of cooling. The higher, therefore, within certain limits, previously hardened steel is heated before being cooled, the softer it gets by cooling. As hardened steel, in being heated up slowly, shows on its surface a series of colors, appearing one after the other in regular succession, each of which colors corresponds to a certain temperature, the relative temperature of the steel can at any moment be ascertained with sufficient accuracy, and the process can be interrupted at the right moment, so as to obtain the desired degree of hardness. This operation is called the tempering of steel, and it is evident from the above that the steel must always be hardened before being tempered. The process of hardening and tempering can be repeated a great number of times with one and the same piece of steel.

The most plausible scientific explanation of the interesting and useful phenomena connected with the hardening and tempering of steel is as follows: I have stated, as a general principle, that iron is the harder the more the carbon is with which it is combined. Now, steel in its ordinary and natural state, contains not only a certain amount of carbon with which it is chemically combined, but it also contains, as a purely mechanical admixture, a certain amount of carbon with which it is not combined, but which is present as graphite in the shape of small, dark colored crystalline lamellæ of a smooth and splendent appearance. These lamellæ are generally so small that they cannot be seen with the naked eye, but they give the unhardened steel a darker hue and some brilliancy in the fracture, both of which it loses by being hardened. When the steel is heated to a red heat, or higher, the affinity of the carbon and iron increases, and the carbon, heretofore existing as graphite in an uncombined state, now combines with the iron, producing a harder carburet. When the steel is after this allowed to cool slowly, the carburet partly decomposes again, and the steel returns to its former condition. When, on the contrary, the heated steel is suddenly cooled off, it acquires too high a degree of rigidity throughout its mass to allow the decomposition of the carburet and the crystallization of the graphite to take place, and the steel remains in its higher state of carburization and hardness.

Wrought iron cannot harden because it contains so small an amount of carbon that none of it is ever secreted as graphite, but the whole of the carbon contained in wrought iron is always combined with the iron. On the other hand, cast iron cannot well be hardened on account of its low melting point, as it melts at that temperature which would be necessary to combine its graphite. If, however, gray cast iron is heated not fully to its melting point and cooled, I have no doubt that it really does get somewhat harder. But the difference between the hardened and unhardened material is not as striking as it is with steel, because cast iron contains, even in its unhardened state, so high an amount of combined carbon that it is even then almost as hard as hardened steel. White cast iron, in which the whole amount of carbon—sometimes up to four per cent.—is combined, is harder than any steel.

After having said so much about steel, but little, comparatively, remains to be said about cast iron. For all the remarks regarding the presence of carbon in its two different states, as combined, and as graphitic carbon, apply equally well to cast iron. Cast iron is easily distinguished from both steel and wrought iron, by its great natural hardness and total inflexibility, and by its incapacity for being forged or welded. It melts much easier than steel. Its percentage of carbon varies from 3 to 5 per cent. When molten cast iron containing 4 or 5 per cent. of carbon, is poured on a dry sand-bed, and allowed to cool slowly, a considerable part, sometimes more than half of its carbon separates from the iron with which it is combined, and is secreted as graphite in the shape of black crystalline lamellæ, with smooth and splendent surface. This crystalline graphite is generally pretty evenly distributed through the whole mass of the iron, and gives its fracture a fine black color, and a splendent and crystalline grain. The size of the grain, and the brilliancy of the fracture increase with the amount of carbon present, with the temperature of the iron when poured, and with the slowness of cooling. Such graphitic iron is called gray cast iron.

When this same molten cast iron is cooled off rapidly by being poured into water, or over cold iron, the carbon has no time to separate and to crystallize as graphite, but remains all in a combined state. In this case the iron is exceedingly hard and quite brittle, and when broken cold, shows a bright white grainless structure, inclined to form long and narrow crystalline faces, often arranged in radiating groups. This is called white cast iron, though it is in this case made white artificially. When smelted and cooled slowly this iron can be made gray again. The less carbon, however, a certain kind of cast iron contains, the more inclined it is to become white, and when the percentage of carbon is as low as three the iron cannot any longer be obtained gray by ordinary means. Such an iron is a regular, unartificial white iron. It contains all its carbon in a combined state. Yet by slow cooling, effected by more complicated artificial means, it can be obtained grainy and graphitic. We see that the difference between a gray and a white cast iron is, to a certain extent and within certain limits, accidental.

An iron that is neither very graphitic nor entirely white is called mottled.

By very slow cooling from a very high temperature a cast iron can be obtained, in which by far the greater portion of the carbon is present as graphite, leaving but little of it combined. Such an iron is then but a mechanical mixture of soft steel with graphite, and is sometimes soft enough to be, to some extent, malleable.

The tensile strength of cast iron averages about 2000 lbs. per square inch, being very much lower than that of either steel or wrought iron. This is very remarkable, because the fact that steel is stronger than wrought iron, indicates that an increase of carbon would make the iron stronger, and that cast iron would, therefore, carry more weight than steel. But there appears to be a limit to this which, being exceeded, the strength of iron seems rapidly to diminish. I do not know exactly where this limit lies, but it must be between 2 per cent. and 3 per cent. of carbon.

I have said before that iron with one-half to 2 per cent. of carbon is steel, and that iron with 3 to 5 per cent. of carbon is cast iron. I will now add that not much is known about iron with an amount of carbon between 2 and 3 per cent. This material is hardly ever produced, being of not much practical use. It cannot be forged like steel, and it requires a higher temperature than cast iron to melt. It is therefore less easily brought into any required shape, and even when so it is too brittle to be reliable for any practical purpose. No careful tests of strength have ever been made with this material, so that we cannot tell how much carbon corresponds to the greatest tensile strength of a carburet of iron. It is evident that hammering and rolling must increase the strength of wrought iron and steel considerably, and to make a comparison between the strength of all these carburets of iron for merely scientific purposes, it would be necessary to make careful experiments on the strength of such wrought iron and such steel that has been smelted but not hammered, nor rolled. It seems probable, however, that the smelted, but unworked materials, would likewise prove stronger than cast iron.

If there is a gap of almost useless materials between steel and cast iron, it is not so between steel and wrought iron; in fact, the transition is there so complete and gradual, that there are materials of which it is difficult to say whether they should be called wrought iron or steel. Some of these intermediate materials are now produced on purpose, and in large quantities. Such are, for instance, homogeneous iron, soft puddled steel, soft cement or blister steel, malleable castings, and most Bessemer metal.

For the sake of simplicity and clearness, I have not spoken heretofore of any of the manifold chemical matters frequently contained in iron and steel beside carbon, such as sulphur, phosphorus, silicon, titanium, chromium, manganese, copper, and others. It may suffice to mention them, but I must add that some of them actually replace the carbon to a certain extent, and therefore when they are present in appreciable quantities, reduce the amounts of carbon as given above. All of them exercise a marked influence on the qualities of the carburets of iron, some, generally, a bad one, as for instance sulphur, phosphorus, silicon and copper.

Steel, which is expected to unite the principal good qualities of both cast and wrought iron, is especially sensitive regarding these impurities, and it may be said, that the greatest mystery in making good steel consists mainly in finding and using pure materials.

Gentlemen, in the hope not to tire you by such a hard subject as iron and steel undoubtedly is, I will say a few words on the manufacture of iron and steel, and then conclude with a short description of the Bessemer process, which is both the most interesting and the most successful process of modern invention.

Cast or pig iron is made from the various iron ores in blast furnaces by a smelting process, in the course of which the iron passes through all the different degrees of deoxidation and carburization. The ores as they descend in the blast furnace, bedded on layers of coal and flux, are at first dried, then reduced by the action of coal and gases into metallic iron. The latter is in the middle parts of the furnace gradually carburized, passing through the state of wrought iron into that of steel. In the latter state it begins to melt, and is, when in a semi-fluid condition, finally fully carburized to cast iron under the influence of the high temperature existing in the lower parts of the furnace. The higher the temperature is the more carbon combines with the iron, and the grayer is the cast iron produced. The cast iron is cast into the shape of bars two or three inches in diameter, and three to four feet long, which are called pigs.

I mention here as an interesting curiosity that there is a metallurgical process by which the iron is made to pass through all these stages, only in a reversed succession. I mean the Bessemer process. There gray pig iron is smelted, and afterward decarburized by the action of compressed air blown through it. It passes, by the gradual removal of carbon, through the condition of white iron and steel into the final state of molten wrought iron, and if the process is continued over this point the iron becomes again oxidized, the result being a silicious black iron ore essentially the same substance from which the iron was originally made.

Thus, while the blast furnace process makes pig iron out of ore, it may be said that the Bessemer process can make ores from pig iron, which, however, is not a great advantage, and if the Bessemer process had not other advantages of greater value it would certainly not have reached its present celebrity and importance.

Wrought iron is manufactured from decarburization of pig iron mainly by two different processes, according to the kind of fuel which happens to be at the disposal of the manufacturer. These two processes are the hearth process, with charcoal as fuel, and the puddling process, generally with mineral coal as fuel.

(To be continued).

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The iron ore companies operating on Lake Superior, which had long charters for tonnage over the lakes which they had no profitable use for last season, and do not expect to use this, have compromised with most of the owners, so they have been relieved. A few charters are carried over by giving them a few cargoes this season, some next and some the next. All would have expired this season by contract if business had justified their use.

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The Irondale Furnace, Washington county, Mo., went out of blast March 23d, after a run of sixteen months, the longest it had ever made. This furnace has a 9½ foot bosh, and the average for the whole time was nearly twenty-two tons per day, a total of 10,306 tons, over 9000 tons being No. 1 iron, which is certainly a very creditable record, and only exceeded by one furnace in Missouri—the Scotia.

## London Metal Market.

*(From The Mining Journal.)*

| | £. | s. | d. | £. | s. | d. |
|---|---|---|---|---|---|---|
| **Copper—₱ ton.** | | | | | | |
| Best Selected | 80 | 0 | 0 | | — | |
| Tough Cake & Tile | 87 | 0 | 0 | | — | |
| Sheathing and Sheets | 98 | 0 | 0 | | — | |
| Bolts | 95 | 0 | 0 | 98 | 0 | 0 |
| Bottoms | 95 | 0 | 0 | 98 | 0 | 0 |
| Old | 83 | 0 | 0 | 85 | — | |
| Australian Wallaroo | 90 | 0 | 0 | | — | |
| " other brands | 88 | 0 | 0 | 89 | 0 | 0 |
| Chili bars, good | 80 | 0 | 0 | 81 | 10 | 0 |
| Wire ₱ lb. | 0 | 1 | 0 | | — | |
| Tubes " | 0 | 1 | ¼ | | — | |
| **Brass—₱ lb.** | | | | | | |
| Sheets | 0 | 0 | 9¼ | 0 | 0 | 10⅛ |
| Wire | 0 | 0 | 9⅛ | 0 | 0 | 0 |
| Tubes | 0 | 0 | 12 | 0 | 0 | 12½ |
| Yellow Metal Sheathing | 0 | 0 | 7¾ | 0 | 0 | 8⅛ |
| Sheets | 0 | 0 | 7⅜ | 0 | 0 | 7⅝ |
| **Spelter—₱ ton.** | | | | | | |
| Foreign on the spot | 23 | 7 | 6 | 0 | 0 | 0 |
| " to arrive | 23 | 10 | | | | |
| **Zinc—₱ ton.** | | | | | | |
| In Sheets | 30 | 10 | 0 | | 0 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Quicksilver—₱ bottle.** | 15 | 0 | 0 | | | |
| **Tin—₱ ton.** | | | | | | |
| English Blocks | 91 | 0 | 0 | | 0 | 0 |
| Ditto Bars (in bris.) | 95 | 0 | 0 | | 0 | 0 |
| Ditto Refined | 96 | 0 | 0 | | — | |
| Banca | 93 | 0 | 0 | | — | |
| Straits | 93 | 10 | 0 | 97 | 10 | |
| Australian | 85 | 0 | 0 | 86 | 0 | 0 |
| *** Tin Plates—₱ box.** | | | | | | |
| IC Charcoal.....1 qual. | 1 | 18 | 0 | | | |
| IX " .....1 qual. | 2 | 4 | 0 | | | |
| IC " .....2 qual. | 1 | 16 | 0 | 1 | 17 | 0 |
| IX " .....2 qual. | 2 | 2 | 0 | 2 | 8 | 0 |
| IC Coke | 1 | 6 | 6 | 1 | 7 | 6 |
| IX " | 1 | 12 | 6 | 1 | 13 | 6 |
| Canada Plates.....₱ ton. | 18 | 10 | 0 | 19 | 0 | 0 |
| " at works | 18 | 0 | 0 | 18 | 10 | 0 |
| **Iron—₱ ton.** | | | | | | |
| Bars Welsh, in London | 8 | 15 | 0 | | — | |
| " to arrive | 8 | 12 | 6 | 8 | 15 | 0 |
| Nail Rods | 9 | 5 | 0 | | — | |
| Nail Rods, Staff'd in L'ndon | 10 | 0 | 0 | | — | |
| Bars | 10 | 0 | 0 | 11 | 0 | 0 |
| Hoops | 11 | 0 | 0 | 12 | 0 | 0 |
| Bars at Works | 9 | 0 | 0 | 11 | 0 | 0 |
| Hoops ditto | 10 | 0 | 0 | 11 | 10 | 0 |
| Sheets, single, and plates | 14 | 0 | 0 | 14 | 10 | 0 |
| Pig, No. 1, in Wales | 5 | 0 | 0 | 6 | 10 | 0 |
| Refined metal ditto | 7 | 0 | 0 | 8 | 0 | 0 |
| Bars, common ditto | 7 | 15 | 0 | 8 | 0 | 0 |
| Do, merchant, Tyne or Tees | 8 | 0 | 0 | 8 | 10 | 0 |
| Ditto, Railway, in Wales | 6 | 15 | 0 | 7 | 0 | 0 |
| Ditto, Swedish, in London | 16 | 0 | 0 | 17 | 5 | 0 |
| To arrive | 17 | 0 | 0 | | — | |
| Pig, No. 1, in Clyde | 3 | 12 | 6 | 4 | 17 | 6 |
| Ditto, f.o.b., Tyne or Tees | 4 | 0 | 0 | 4 | 5 | 0 |
| Ditto, Nos. 3, 4, f.o.b | 3 | 10 | 0 | 4 | 0 | 0 |
| Railway Chairs | 5 | 0 | 0 | 5 | 5 | 0 |
| " Spikes | 12 | 10 | 0 | 14 | 0 | 0 |
| Indian Ch'coal Pigs in L'don | 8 | 0 | 0 | 10 | 0 | 0 |
| **Steel—₱ ton.** | | | | | | |
| Swedish, in kegs (rolled) | | | | | — | |
| Ditto (hammered) | 19 | 0 | 0 | 20 | 0 | 0 |
| Ditto, in faggots | 20 | 16 | 0 | | | |
| English, spring | 19 | 0 | 0 | 24 | 0 | 0 |
| **Lead—₱ ton** | | | | | | |
| English Pig, common | 21 | 0 | 0 | | — | |
| Ditto, LB | 21 | 5 | 0 | | — | |
| Ditto, WB | 21 | 0 | 0 | | | |
| Ditto, Sheet | 22 | 10 | 0 | | | |
| Ditto, Red Lead | 24 | 0 | 0 | | | |
| Ditto, White | 30 | 0 | 0 | 32 | 0 | 0 |
| Ditto, Patent Shot | 26 | 0 | 0 | | — | |
| Spanish | 20 | 10 | 0 | 20 | 15 | 0 |

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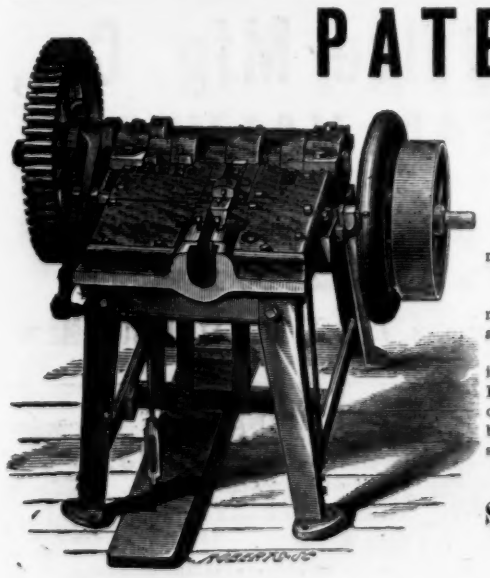
## PATENT BOLT HEADER



Manufactured by

WILLIAM GARDNER'S SONS,
575 Grand Street, N. Y.

Having investigated the comparative merits of this and all other machines, we can recommend it as the Best Bolt Header ever made.

It will commend itself for simplicity, durability, quality and quantity of work over all others.

It will make perfect Square or Hexagon Bolts, in from 3 to 5 revolutions, and runs at the rate of one hundred and twenty revolutions per minute. Plough, Track, Button-head Bolts, and all similar heads are made with one revolution.

To show that it will stand the test of long continued strain, it has made eleven tons of half-inch Bolts from one-and-one-quarter to two-and-one-half inches long; eighteen tons five-eighth Bolts; twenty-six tons three-quarter Bolts, and thirty seven tons seven-eighth Bolts, by one set of dies for each size, without change or repairs. It makes and cuts off the bolt from the heated bar, from one to ten inches, or of any greater length cut for the purpose, and either round or square Iron may be used.

ANY STYLE OF HEAD CAN BE MADE, INCLUDING

Square, Hexagon, T, Button, Countersunk, Cone, Plough and Track Bolts, &c., &c.

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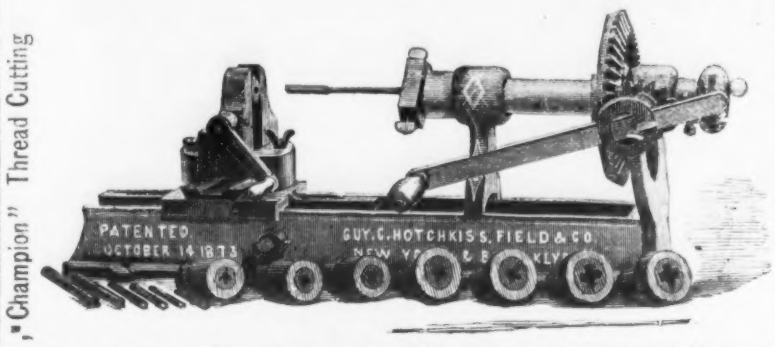
## Guy C. Hotchkiss, Field & Co.,

85 First St., Brooklyn, E. D., and New York City.

"Champion" Thread Cutting and Nut Tapping Machine.




This machine has revolving and sliding jams, which enables the operator to cut all kinds work, no matter how irregular in shape it may be. It cuts a perfect thread at once going over. As much work can be done in one hour by this machine as in a day with stocks and dies. Send for Circular.

Manufacture Carriage Materials, Axles, Springs, Blacksmiths' Supplies, Bolts, Wood Work, Trimmings, &c.

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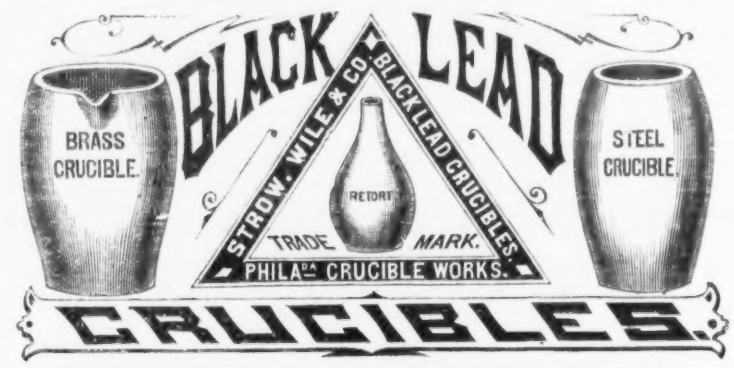


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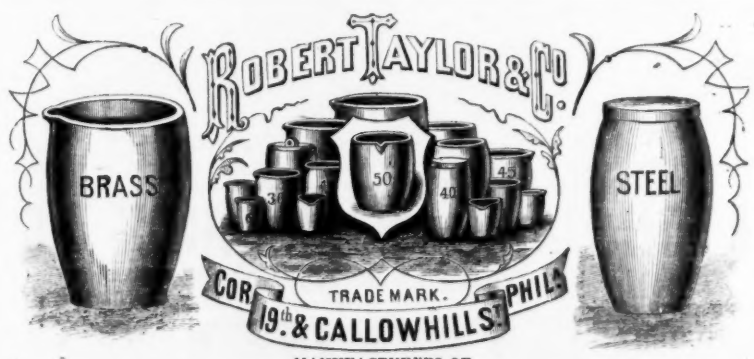


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Of all Sizes and Forms for melting

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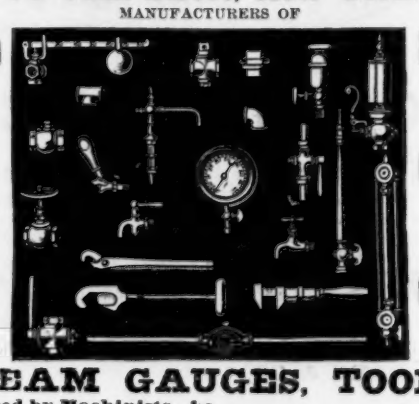

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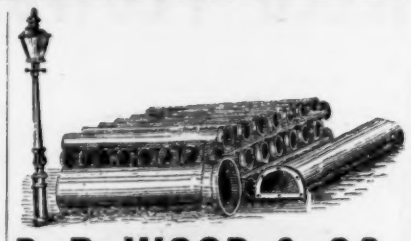

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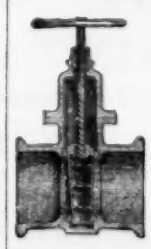

WATER and GAS Gates, 3 to 48 inches

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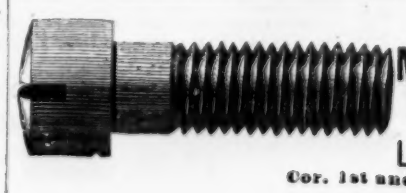

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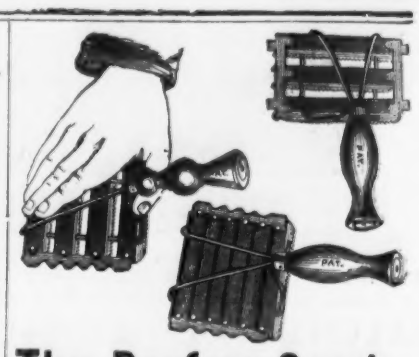


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Horton & Mabie, Peekskill, N. Y. ..... 27
Kreischer B. & Son, 58 Goerck, N. Y. ..... 27
Miller S. P., 309 S. 5th, Philadelphia. ..... 27
Newkumet Philip, 23d and Vine, Phila. ..... 27
Newton & Co., Albany, N. Y. ..... 27
Watson John R. Perth Amboy, N. J. ..... 27

**Fishing Tackle.**
Shipley A. B. & Son, 503 and 505 Commerce, Phila. ..... 3

**Flint and Emery Paper and Cloth.**
Baeder, Adamson & Co., 720 Market, Phila. ..... 11

**Fluting Machines.** *Makers of*
Felder Chas., 1 & Chambers, N. Y. ..... 18

**Founders and Machinists.**
Garrison A. & Co. Pittsburgh, Pa. ..... 4

**Galvanized Iron.**
Lefferts Marshall Jr., 90 Beekman, N. Y. ..... 4

**Gas Fixtures.** *Makers of.*
Bradley & Hubbard Mfg. Co., 21 & 23 Barclay, N. Y. ..... 40

**Glass.** *Importers of.*
Downing A. C. & Co., 57 Beekman, N. Y. ..... 31

**Governors.**
Huntoon Governor Co., Lawrence, Mass. ..... 33
Hartford Governor Co., Hartford, Ct. ..... 38
Junius Judson & Son, Rochester, N. Y. ..... 38
Shive Governor Co., Bethlehem, Pa. ..... 38

**Grindstones.**
Wood Walter R., 283 and 285 Front, N. Y. ..... 32
Worthington & Sons, North Amherst, O. ..... 33

**Guns, &c**
Schoverling & Daly, 84 Chamber St. ..... 27
Tryon Edw. K., Jr., & Co., 19 N. Sixth, Philadelphia. 13
Windmuller Louis & Roelker, 20 Reade N. Y. ..... 20

**Gunpowder.** *Makers of.*
Kneeland F. L. (Dupont) 70 Wall, N. Y. ..... 36
Lafin & Rand Powder Co. 21 Park Row, N. Y. ..... 36

**Hammers, etc.,** *Manufacturers of.*
Emmet Hammer Co., Brooklyn, E. D., N. Y. ..... 13
Hammond H., Hartford, Ct. ..... 8

**Handles,** *Makers of*
N. Carolina Handle Co., 79 Reade, N. Y. ..... 10

**Hardware,** *Brass and Galvanized.*
Tiebout W. & J., 290 Pearl, N. Y. ..... 2

**Hardware Commission Merchants.**
Graham & Haines, 85 Chambers, N. Y. ..... 34
Heaton & Denckla, Phila. and N. Y. ..... 6
Peck G. Webster, 110 Chambers, N. Y. ..... 17
Walbridge G. B. & Co. 99 Chambers, N. Y. ..... 31
Walsh, Coulter & Flagler, 83 Chambers, N. Y. ..... 8
Wilson J. Clark & Co., 81 Beekman N. Y. ..... 19

**Hardware Dealers.**
Brower John I. & Son, 288 Greenwich, N. Y. ..... 18
Lloyd, Suppiee & Walton, 625 Market, Phila. ..... 10
Quackenbush, Townsend & Co., 59 Reade, N. Y. ..... 19
Shepard Sidney & Co., Buffalo N. Y. ..... 31
Wilson J. Clark & Co., 81 Beekman N. Y. ..... 19

**Hardware Importers.**
Boker Hermann & Co., 101 Duane, N. Y. ..... 33
Field Alfred & Co., 93 Chambers, N. Y. ..... 33
King, Briggs & Co., 80 Chambers N. Y. ..... 10
Van Wart & McCoy, 134 and 136 Duane, N. Y. ..... 10
Turnor R. A., 37 Chambers, N. Y. ..... 11
Windmuller Louis & Roelker 20 Reade N. Y. ..... 20

**Hardware Manufacturers.**
American Spiral Spring Butt Co., 82 Beekman, N. Y., 40
Buffalo Hardware Co., Buffalo, N. Y. ..... 3
Enterprise Mfg. Co., Phila. ..... 34
Hart, Bliven & Mead Mfg. Co., 243 Pearl, N. Y. ..... 34
Jacobus & Nimock Mfg. Co., 96 Chambers, N. Y. ..... 6
Lane, Gale & Co., Troy, N. Y. ..... 16
Many & Marshall, 48 Warren N. Y. ..... 13
Middletown Tool Co., 18 & 20 Cliff, N. Y. ..... 6
Miller's Falls Mfg. Co., 78 Beekman, N. Y. ..... 28
Pratt & Co., Buffalo, N. Y. ..... 31
Providence Tool Co., Providence, R. I. ..... 13
Schweitzer Mfg. Co., 57 Reade, N. Y. ..... 28
Shattuck W. F. & Co., 113 Chambers, N. Y. ..... 8
Union Mfg. Co., 90 Chambers, N. Y. ..... 7
Van Wagoner & Williams, 82 Beekman, N. Y. ..... 40
Williams, White & Churchill, 73 Warren, N. Y. ..... 28
Wilson Mfg. Co., 37 Chambers, N. Y. ..... 12

**Hardware Specialties.**
Bracher T. W., 77 Greene, N. Y. ..... 45
Byington & Northup Rochelle, Ills. ..... 2
Post C. C., Burlington, Vt. ..... 18
Shepard Sidney & Co., Buffalo, N. Y. ..... 31

**Hoes.** *Maker of.*
Rogers H. C., Jordan, N. Y. ..... 10
Hicks O. H. & Co., Baltimore, Md. ..... 16

**Hog Ringers.** *Manufacturers of.*
Chambers & Quinlan, Decatur, Ill. ..... 8
Hill H. W. & Co., Decatur Ills. ..... 8

**Hoisting Engines.** *Makers of.*
Crane Bros. Mfg. Co., Chicago, Ill. ..... 40
Otis Bros. & Co., 348 Broadway, N. Y. ..... 9

**Horse Hay Forks and Fixtures,** *Makers of.*
Otis Bros. & Co., Pittsburgh, Pa. ..... 40

**Horse Nails.** *Makers of.*
Ausable Horse Nail Co., 35 Chambers, N. Y. ..... 32
Brundage & Co., Middletown, N. Y. ..... 10
Globe Nail Co., Boston, Mass. ..... 32
Platt & Co., Buffalo, N. Y. ..... 31
Putnam S. S. & Co., Neponset, Mass. ..... 10

**Horse Shoes,** *Makers of.*
Burden Iron Works, Troy, N. Y. ..... 4
Schoenberger & Co., Pittsburgh, Pa. ..... 4

**House Furnishing Goods.**
Bracher T. W., 77 Greene, N. Y. ..... 35
Tifft & Howard, 12 Murray, N. Y. ..... 31

**Hydraulic Jacks.**
Dudgeon Richard, 24 Columbia, N. Y. ..... 38

**Ice Tools.**
Carter W. H., 100 Chambers, N. Y. ..... 32

**Insurance, Boiler.**
Hartford Steam Boiler Inspection and Insurance Co. ..... 35

**Iron Brokers.**
Boynton Geo. A., 70 Wall, N. Y. ..... 4
Crane U. O., 104 John, N. Y. ..... 4
Hatry A. G., Pittsburgh, Pa. ..... 4
Hazard & Jones, 204 Pearl, N. Y. ..... 4
Read & Dickey, Cleveland, O. ..... 40

**Iron, Corrugated.** *Manufacturers of.*
Mosely Iron Bridge and Roof Co., 5 Dey, N. Y. ..... 4

**Iron, Charcoal,** *Warm or Cold Blast.*
Quincy John W., 96 William, N. Y. ..... 4

**Iron Commission Merchants.**
Justice Cox Jr. & Co., 302 Walnut, Phila. ..... 5
Conklin Henry, 104 John, N. Y. ..... 4
Hand Jas. C. & Co., 614 and 616 Market, Phila. ..... 6
Hoopes W. Graham, 419 Walnut, Phila. ..... 5
Malin Bros., 228 Dock, Phila. ..... 5
Spooner & Collins, St. Louis, Mo. ..... 5

**Iron, Pig,** *Importers of.*
Williamson James & Co., 69 Wall, N. Y. ..... 4

**Iron Dealers.**
Abeel Brothers, 120 South, N. Y. ..... 4
Bonnell, Botsford & Co., Youngstown, O. ..... 5
Borden & Lovell, 70 and 71 West, N. Y. ..... 4
Cleveland, Brown & Co., Cleveland, O. ..... 6
Coddington T. B. & Co., 25 Cliff, N. Y. ..... 4
Huerstel G., 99 Market Slip, N. Y. ..... 4
Fuller, Lord & Co., 139 Greenwich, N. Y. ..... 4
Fuller, Dana & Fitz, 110 North, Boston. ..... 2
Gardner Wm., 575 Grand, N. Y. ..... 4
Harrison & Gilloon, 559 to 562 Water, N. Y. ..... 4
Holden, Hopkins & Stokes, 104 John, N. Y. ..... 4
Jackson & Chase, 206 and 208 Franklin, N. Y. ..... 4
Judson B. F., 457 and 459 Water, N. Y. ..... 4
Matthews Chas. W., 133 Walnut Phila. ..... 5
Mohr J. J., Philadelphia ..... 5
Ogden Wallace, 342 Pearl, N. Y. ..... 4
Packard, Goff & Co., Youngstown, O. ..... 4
Pettee & Mann, 228 and 229 South, N. Y. ..... 4
Pierson & Co., 24 Broadway, N. Y. ..... 4
Quincy John W., 96 William, N. Y. ..... 4
Reed John H. & Co. ..... 4
Richards D. W. & Co., 22 Maugin St., N. Y. ..... 4
Richardson J. O., 329 Walnut, Philadelphia. ..... 5
Snyder Asa, Richmond, Va. ..... 4
Stroud Wm. Lawrence, 104 John, N. Y. ..... 4
Wallace Wm. H. & Co., Albany and Washington streets, N. Y. ..... 4
Warner A. B. & Sons, 28 and 29 West, N. Y. ..... 4
Williamson James & Co., 69 Wall, N. Y. ..... 4
Whitney A. B. & Co., 88 Hudson N. Y. ..... 4

**Iron,** *Manufacturers of.*
Britannia Iron Works, Middlesbro', Eng. ..... 6
Burden Iron Works, Troy, N. Y. ..... 4
Cleveland Rolling Mill Co., Cleveland, O. ..... 6
Coffin Wm. E. & Co., 8 Oliver, Boston. ..... 4
Boston Rolling Mills, 17 Batterymarch, Boston. ..... 4
Everson, Macrum & Co., Pittsburgh, Pa. ..... 4
Girard Rolling Mill Co., Girard, O. ..... 4
Lackawanna Iron and Coal Co., Scranton, Pa. ..... 5
Leonard John, 450 & 451 West st., N. Y. ..... 4
Milwaukee Iron Co., Milwaukee, Wis. ..... 6
Naylor & Co., 6 Oliver, Boston. ..... 4
Old Dominion Iron & Nail Works Co., Richmond, Va. 6
Oxford Iron Co., 81 Washington, N. Y. ..... 4
Phœnix Iron Co., 410 Walnut, Phila. ..... 5
Rowland Wm. & Harvey, Phila. ..... 40
Sterling Iron and Railway Co., 42 Pine, N. Y. ..... 20
Shoenberger & Co., Pittsburgh, Pa. ..... 4
Taylor, Mitchell & Pond, Massillon, O. ..... 4

**Iron, Swedish.** *Importers of.*
Jessop Wm. & Sons, 91 and 93 John, N. Y. ..... 36
Mitander Nils, 69 William, N. Y. ..... 4

**Keys and Cutters.** *Manufacturers of.*
Barnes Geo. & Co., Syracuse, N. Y. ..... 36

**Knitting Machines, Upright Rotary,** *Makers of.*
Clark Tompkins, Troy, N. Y. ..... 31

**Lace Leather,** *Manufacturers of.*
Fales Geo. S., Pawtucket, R. I. ..... 26

**Lamps.** *Manufacturers of.*
Patent Mechanical Lamp Co., 138 Chambers, N. Y. ..... 32

**Lanterns.** *Manufacturers of.*
Dietz R. E., (Tubular) 54 and 56 Fulton, N. Y. ..... 40
Howard & Morse, 45 Fulton, N. Y. ..... 2

**Lead Pipe, &c.,** *Manufacturers of.*
Bayley, Farrell & Co., Pittsburgh, Pa. ..... 2

**Locks.** *Manufacturers of.*
Bohannan Wilson, Broadway and Kosauth, Brooklyn, E. D. ..... 13
Branford Lock Works, Branford, Conn. ..... 34
D. R. Miller Lock Co., 712 Cherry, Philadelphia. ..... 40
Romer & Co., Newark, N. J. ..... 11
Trenton Lock Co., 43 Warren, N. Y. ..... 13
Yale Lock Mfg. Co., 289 Broadway, N. Y. ..... 9

**Lubricators. (Patent)** *Maker of.*
Crossley H., Brooklyn, N. Y. ..... 33

**Machinery,** *Makers of.*
Forsaith S. C. & Co., Manchester, N. H. ..... 38
Pratt & Whitney Co., Hartford, Conn. ..... 38
Sellers Wm. & Co., 1600 Hamilton, Phila. ..... 40
Wetherill Robert & Co., Chester, Pa. ..... 38
Whittier Machine Co., 1176 Front, Boston, Mass. ..... 38
Wood Thomas, 2106 Wood, Phila. ..... 40

**Machine Screws,** *Makers of*
American Screw Co., Providence, R. I. ..... 13
Lyon & Fellows Mfg. Co., Williamsburg, N. Y. ..... 36
Reynolds & Co., New Haven, Conn. ..... 4
Rochester Machine Screw Co., Rochester, N. Y. ..... 18

**Machinists' Tools.** *Makers of.*
Blaisdell P. & Co., Worcester Mass. ..... 39
Harrington Edwin & Son, 18th st. and Pa. ave., Phila. 32
New Haven Mfg. Co., New Haven, Ct. ..... 39

**Machinery and Tools,** *Importers of.*
Graham Bros., 122 Cannon street, London, E. C. ..... 36

**Malleable Articles,** *Maker of.*
Hammer & Co., Branford, Ct. ..... 32

**Manganese.**
Hobbs, Pope & Co., 85 India st., Boston ..... 34

**Measuring Tapes.**
Eddy Geo. & Co., 283 Classon Ave., Brooklyn, N. Y. ..... 30

**Metal Dealers and Brokers.**
Coddington T. B. & Co., 25 and 27 Cliff, N. Y. ..... 4
Colt Edward W., 205½ Walnut, Phila. ..... 4
Cort N. L. & Co., 220 & 222 Water, N. Y. ..... 2
Crane U. O., 104 John, N. Y. ..... 4
Crocker Bros., 92 Cliff, N. Y. ..... 9
Gregg H. L. Co., 108 Walnut, Phila. ..... 5
Lefferts J. C., 241 Pearl, N. Y. ..... 4
W. J. Hammond, Pittsburgh, Pa. ..... 2
Phelps, Dodge & Co., Cliff, bet. John & Fulton, N. Y. 2
Purves A. & Son, cor. South and Penn, Phila. ..... 16
Quincy J. W., 98 William, N. Y. ..... 2
Sturges Frank & Co., 72, 74 & 76 Lake, Chicago. ..... 3
Thomson A. A. & Co., 213 and 215 Water, N. Y. ..... 2
Van Wart & McCoy, 134 and 136 Duane N. Y. ..... 2

**Metallurgists.**
Britton J. Blodgett, 339 Walnut, Phila. ..... 6
Drown Thomas M., Lafayette College, Easton, Pa. ..... 6
Maynard & Van Rensselaer, 25½ Broadway, N. Y. ..... 6
School of Mines, E. 49th, N. Y. ..... 6

**Mining Spikes**
Roseberry Geo. D., Pottsville, Pa. ..... 4

**Miner's Candles,** *Makers of.*
Joseph Boyd's Sons, 12 Franklin N. Y. ..... 31

**Molding Machines,** *Makers of*
Corbin P. & F., New Britain, Ct. ..... 34

**Molders' Tools.**
Carter H., 290 Pearl, N. Y. ..... 10

**Mop Heads.** *Manufacturers of.*
Buffalo Hardware Co., Buffalo N. Y. ..... 3

**Mouse Traps, Catchemalive.** *Makers of.*
Dietz R. E., 54 and 56 Fulton, N. Y. ..... 10

**Nails.**
Schoenberger & Co., Pittsburgh, Pa. ..... 4

**Nickel Platers.**
Hartman John, 1042 Ridge avenue, Philadelphia. ..... 2
New York Nickel Plating Co. 133 West 25th, N. Y. ... 2

**Norway Shapes,** *Rollers of.*
Rowland Wm. & Harvey, Frankford, Phila. ..... 40

**Note Broker.**
Gallaudet F. W., 3 and 5 Wall, N. Y. ..... 4

**Nuts, Bolts, etc.,** *Makers of.*
American Bolt Co., 210 Lawrence, Lowell, Mass. ..... 13
Arms, Bell & Co., Youngstown, O. ..... 12
Carpenter David, 402 Water N. Y. ..... 4
Clark Bros. & Co., Millsdale, Conn. ..... 12
Fuller, Lord & Co., 139 Greenwich, N. Y. ..... 4
Haskell W. H. & Co., Pawtucket, R. I. ..... 18
Hoopes & Townsend, 1330 Buttonwood, Phila. ..... 12
Lewis, Oliver & Phillips, Pittsburgh, Pa. ..... 18
New Haven Nut Co., Westville, Ct. ..... 26
Old Colony Rivet Works, 116 Chambers, N. Y. ..... 12
Roseberry Geo. D., Pottsville, Pa. ..... 4
Russell, Birdsall & Ward, Port Chester, N. Y. ..... 40
Plumb, Burdict & Barnard, Buffalo, N. Y. ..... 40
Shelton Co., Birmingham, Conn. ..... 11
Sternbergen J. H., Reading, Pa. ..... 18
Union Nut Co., 78 Beekman N. Y. ..... 38

**Oil Stones.** *Makers of.*
Boyd & Chase, 107th street and 1st avenue, N. Y. ..... 32

**Oil Tanks,**
Wetzel E. F. W., 75 Warren, N. Y. ..... 28

**Old Iron, etc.**
Gregg H. L. & Co., 108 Walnut, Philadelphia. ..... 5

**Ore Crushers.**
Blake Crusher Co., New Haven, Ct. ..... 38

**Packing for Engines, &c.,** *Manufacturers of.*
Glanding Jas. & Co., 115 Queen, Philadelphia. ..... 38

**Paints.**
Rocky Mountain Vermillion Paint Co., Prov., R. I. ..... 32

**Paints and Oils,** *Dealers in.*
Devoe F. W. & Co., 117 Fulton, N. Y.

**Patent Solicitors.**
A. V. Briesen, 258 Broadway, N. Y. ..... 20
Burke & Fraser, 37 Park Row, N. Y. ..... 28
Cox & Cox, 229 Broadway, N. Y. ..... 28
Bowson & Son, Phila. and Washington, D. C. ..... 28
Munn & Co., *Scientific American* 37 Park Row N. Y. 33
Stetson T. D., 23 Murray, N. Y. ..... 28

**Picture Nails, etc.,** *Manufacturers of.*
Richards T. C. & Co., 47 Murray, N. Y. ..... 3

**Pipes, Fittings, etc.,** *Makers of.*
Eaton, Cole & Burnham Co., 58 John, N. Y. ..... 28
Meyer Henry C. & Co., 48 Cliff, N. Y. ..... 40
McNab & Harlin Mfg. Co., 56 John, N. Y. ..... 28
Nelson, Finkel & Co., 439 E. 10th st., N. Y. ..... 26
Pancoast & Maule, 227 Pear, Phila. ..... 28

**Pipe Threaders, Cutters, &c,**
Converse, M. D., 68 Park Place, N. Y. ..... 28
Empire Mfg. Co., 18 William, N. Y. ..... 39

**Pipe, Water and Gas,** *Makers of.*
McNeal John & Sons, Burlington, N. J. ..... 6
Morris, Tasker & Co., 15 Gold, N. Y. ..... 28
National Tube Works Co., 28 William, N. Y. ..... 28
Warren Foundry & Mach. Co., Phillipsburg, N. J. ..... 28
Wood R. D. & Co., 173 Broadway, N. Y. ..... 28

**Piston Packing.**
Canfield John & Co., 1321 Fairmount Ave., Phila. ..... 35

**Plane Irons,** *Manufacturer of*
Buck Bros., Millbury, Mass. ..... 11
Middletown Tool Co., 18 & 20 Cliff, N. Y. ..... 6

**Planes,** *Manufacturers of.*
Greenfield Tool Co., Greenfield, Mass. ..... 34
Stanley Rule & Level Co., 35 Chambers, N. Y. ..... 26

**Plated Ware**
Derby Silver Co., Derby, Ct. ..... 40
Rogers & Bro. 208 Broadway. ..... 11

**Plows, Chilled Iron.** *Makers of.*
South Bend Iron Works, South Bend Ind. ..... 24

**Plumbago Lubricator.**
Joseph Dixon Crucible Co., Jersey City, N. J. ..... 40

**Plumbers' Materials,** *Manufacturers of*
Carr Wm. S. & Co., 106 Centre, N. Y. ..... 28

**Portable and Stationary Forges.**
Empire Portable Forge Co., 50 John, N. Y. ..... 14

**Power Hammers,** *Makers of.*
Forsaith S. C. & Co., Manchester, N. H. ..... 38

**Presses, Power,** *Makers of.*
The Stiles & Parker Press Co., Middletown, Ct. ..... 38

**Pressure Blowers,** *Makers of.*
Sturtevant B. F., 72 Sudbury, Boston. ..... 30

**Pulsometer Pumps.**
Hall C. Henry & Co., 20 Cortlandt, N. Y. ..... 16

**Pumps,** *Makers of.*
Burlingham & Purdy, 103 Chambers St. ..... 7
Douglas W. & B., Middletown, Conn. ..... 7
Rich William A., 107 Reade, N. Y. ..... 7
Union Mfg. Co., 99 Chambers, N. Y. ..... 7
Valley Mch. Co., Easthampton, Mass. ..... 7

**Pyrometers.**
Brown Edward, 311 Walnut, Phila.

**Railroad Supplies.**
Duyckinck W. G., 50 and 52 Slip, N. Y. ..... 8
Potter, Hoffman & Co., 110 Liberty N. Y. ..... 6

**Rails,** *Importers of.*
Congreve Chas. & Son, 104 and 106 John, N. Y. ..... 37

**Rails, Iron or Steel,** *Makers of.*
Atkins Bros., Pottsville, Pa. ..... 6
Cambria Iron Co., Johnstown, Pa. ..... 5
Cleveland Rolling Mill Co., Cleveland, O. ..... 6
Griswold John A. & Co., Troy, N. Y. ..... 36
Milwaukee Iron Co., Milwaukee, Wis. ..... 6

**Railway Track Tools.**
Metcalf, Paul & Co., Pittsburgh, Pa. ..... 35

**Razor Strops,** *Makers of.*
B. F. Badger, Charlestown, Mass. ..... 26

**Revolvers.**
Tryon K. K., Jr., & Co., 230 N. 2d, Philadelphia. ..... 16

**Rivets.**
Old Colony Rivet Works 34 Warren, N. Y. ..... 12
Timmes Peter, 281 North 6th, Brooklyn, E. D. ..... 4

**Road Scrapers, &c.,** *Makers of.*
Revolving Scraper Co., Columbus, O. ..... 18

**Rolling Mill Machinery, etc.,** *Manufacturers of.*
Birmingham Iron Foundry, Birmingham, Ct. ..... 4
Moore James, Cor 18th and Buttonwood, Phila. ..... 38

**Rules,** *Manufacturers of.*
Stanley Rule and Level Co., 35 Chambers St. ..... 26
Stephens & Co., Riverton, Ct. ..... 17

**Safe Deposit Co.**
Penna. Warehousing & Safe Deposit Co., Front and Lombard, Philadelphia. ..... 28

**Sand and Emery Paper.** *Makers of*
Baeder, Adamson & Co., 720 Market, Phila. ..... 6

**Sash Weights (sectional),** *Manufacturers of.*
Sprague Sash Weight Co., Youngstown, O. ..... 18

**Sash Locks** *Makers of.*
Hammond W. S., Lewisberry, Pa. ..... 35

**Saws,** *Makers of.*
Atkins E. C. & Co., Indianapolis, Ind. ..... 10
Boynton E. M., 80 Beekman, N. Y. ..... 10
Flint J. & Co., Rochester, N. Y. ..... 10
Disston Henry & Sons, Phila. ..... 29
James Ohlen, Columbus, O. ..... 10
Peace Harvey W., Williamsburg, N. Y. ..... 10
Spear & Jackson, 116 Duane, N. Y. ..... 33
Wheeler, Madden & Clemson, Middletown, N. Y. ..... 10

**Saw Frames, Wood,** *Makers of.*
Boynton E. M. 80 Beekman, N. Y. ..... 10
Peace Harvey W., Williamsburg, N. Y. ..... 10

**Seives, Metallic,** *Makers of*
Mann R. J. & Co., St. Louis, Mo. ..... 34

**Scales,** *Manufacturers of.*
Chattillon John & Sons, 91 Cliff, N. Y. ..... 9
Fairbanks E. & T. & Co., 311 B'way, N. Y. ..... 16
Rienle Bros., 9th near Coates, Phila. ..... 24
Shattuck W. F. & Co., 113 Chambers, N. Y. ..... 8
Universal Family Scale Co., Guilford, Conn. ..... 18

**Screws,** *Makers of.*
American Screw Co., Providence, R. I. ..... 13

### Iron Shipbuilding in 1875.

The Philadelphia *Telegraph* says: About 1000 men are at work at present in the Delaware River Iron Ship Building and Engine Works, at Chester, of which Mr. John Roach is president. Additions are being constantly made to the works, and within the last few months a new smith shop and new engine and boiler houses have been erected.

At this ship yard two of the eight sloops of war constructed under the act of Congress have been built. They are of iron, and are named the Alert and the Alliance. The Alert is nearly completed, having received her machinery. The Alliance has been launched, and will also be ready for service in a short time. Beside these the sloop of war Ranger, built at Wilmington, has been brought up to the yard to receive her machinery.

The firm are also engaged in rebuilding the double-turretted monitor Miantonomah. This monitor was originally of wood, with iron plating, and she is now being reconstructed entirely of iron. Her frame is just completed, and ready to receive the plating. Her engines and turrets will be used again. Her extreme length is 262 feet 7½ inches; extreme breadth of beam, 55 feet 10 inches; and depth from top of keel to main deck gunnel, 16 feet 6 inches. She will have a ram projecting 3 feet 10 inches. Her armor, for 6 feet below the gunnel, will be 8 inches thick. Her deck beams are ten inches thick; they will be double plated, each plate being one inch thick, and the upper surface will be covered with four inches of wood. She will be "double skinned," and there will be a space of 2 feet between the "skins," which will extend the whole length of the vessel. Her turrets, which are 11 inches in thickness, will each carry two 15 inch guns.

Five old monitors, the Nausett, Niobe, Cohoes, Modoc and Napa, have been broken up at the yard, the iron in them being sold by the government. Condemned iron clads were formerly sold as they stood in the water, but the new method of selling the iron after they have been broken up is considered more advantageous to the government. The rotting of the large quantity of wood used in their construction was the cause of their condemnation. The work of breaking them up has given employment during the winter to a large number of men.

Beside the ship building and other work for the government carried on at this great yard, there are now in course of construction three additional iron steamships for the Pacific Mail Steamship Company. Though smaller in size than their huge predecessors, the City of Peking and City of Tokio, they will be first-class vessels in every respect. They will be similar in build and capacity, and will have each a tonnage of 3500 tons, new measurement. They are not yet named, but the first, which is numbered 150, will be launched about the 1st of May, and the others will follow in speedy succession. These vessels will have an extreme length of 352 feet, breadth of beam molded 40 feet, depth from base line to spar deck gunnel 30 feet 5 inches, depth of hold from floor to main deck 21 feet. Their machinery will consist of compound surface condensing engines. The diameter of the high pressure cylinder will be 51 inches, and of the low pressure cylinder 88 inches, the stroke being 5 feet. Each vessel will have six cylindrical boilers, measuring each 13 feet 1¾ inches by 10 feet 6 inches. The propeller wheel will be 20 feet in diameter and have a pitch of 27 feet, and it is estimated that the ships will reach a speed of 14 knots an hour.

### The New Inman Steamer City of Berlin.

This ship left Queenstown for New York on the 29th inst. She measures 488 feet between the perpendiculars and 520 feet over all. Her molded width is 44 feet, and she is 37 feet in depth to the spar deck. She has four decks, viz., the spar and main decks, the lower and orlop decks. Her gross tonnage, or measurement, is 5490 tons; builder's measurement, 4634 tons; and her register tonnage is 3139. The latter measurement will show that nearly one-half of her gross tonnage is taken up for her steaming purposes. This large vessel was contracted for in October, 1873, and was launched in October, 1874. Both the vessel and engines were built by Messrs. Caird & Co., iron shipbuilders and engineers, of Greenock. The vessel is propelled by a pair of inverted direct acting engines. They are high and low pressure, and of 900 nominal horse-power, but are capable of being worked up to five times that amount of power. The low pressure cylinder is 120 inches, and that of the high pressure cylinder is 72 inches in diameter, with a piston stroke of 5 feet 6 inches. She is supplied with steam by 12 boilers, which are heated by 36 furnaces, and the details have been well cared for. As the upper part of the boiler space is only grated over, it will be well ventilated, and give a good draft as well as a good light, not only to the stoke-hole, but to the lower decks, which are also lighted from this opening. The boilers are so arranged that one or more of them may be cut off, so that when the vessel is under sail she might be worked with only three or four boilers. The vessel has two sets of distilling apparatus, equal to the production of 100 gallons of water per hour. Beside this, she is furnished with water tanks capable of containing 20,000 gallons of water.

Every precaution has been taken in case of accident. Eight strong water-tight compartments divide the vessel into nine separate parts. She carries ten boats, of which number eight are life-boats. There is also on board an unlimited supply of life buoys, and the vessel carries at least one certificated surgeon. As a mail steamer for the Atlantic, or any other trade, she is not second to any in the world as regards speed. On her trial trip she averaged nearly 15 knots, or 14·825 knots.

**Stafford Manufacturing Co.'s**

**STENCIL COMBINATIONS.**

Containing: Stencil Alphabet, Figures, Can Stencil Ink and Brush.

For marking boxes, barrels, bags, and packages for shipment. Printing all manner of show cards, notices, signs, numbers, prices, &c., and other purposes too numerous to mention. Instructive and amusing for boys.

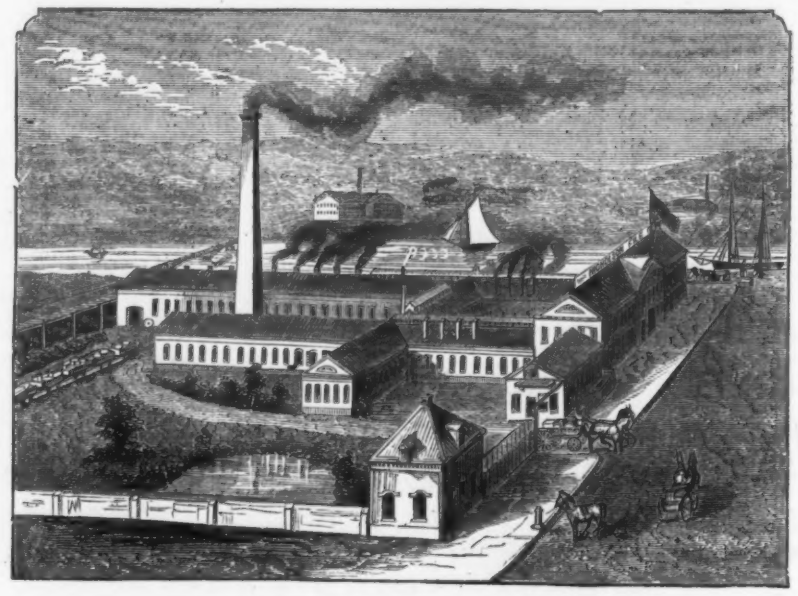
WHOLESALE PRICES.

| | | | |
|---|---|---|---|
| Size, ½ in., per dozen | $6·00 | Size, 1½ in., per dozen | $10·00 |
| " ¾ " " | 6·50 | " 2 " " | 12·00 |
| " 1 " " | 7·00 | " 2½ " " | 18·00 |
| " 1¼ " " | 9·00 | " 1½ " with lower case | 15·00 |

An Illustration of sizes sent on application,

For sale by Hardware Dealers and Stationers.

**No. 66 Fulton Street, New York.**



DEALERS AND CONSUMERS

**OF FILES**

SHOULD PURCHASE THE

# Nicholson or "Increment Cut" File

FOR THE FOLLOWING REASONS:

**First.**—They are made from the best quality of File Steel.

**Second.**—Each File undergoes a careful inspection after each operation, by critical inspectors, and none but perfect work allowed to pass.

**Third.**—They are cut by the **"Increment"** or **irregular cut,** therefore combine the advantages of both Hand and Machine work.

**Fourth.**—They **will finish finer** than Files of any other make of same degree of coarseness.

**Fifth.**—They **will not "pin"** or scratch like hand-cut Files.

**Sixth.**—The **"Increment cut"** File, by our records, **will remove more stock with a given number of pounds applied** than any other File with which we are acquainted.

**Seventh.**—All Files under seven inches are **put up in boxes** of one dozen each, and neatly labeled.

**Eighth.**—The large stock carried by us, combined with our superior facilities, enables us to fill the largest orders at the shortest possible notice.

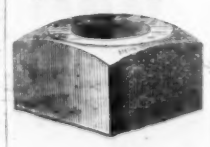
**Ninth.**—We are constantly making careful tests of our Files by delicately constructed machinery, which **automatically records** the **actual power applied,** forward, backward and downward, at each stroke of the File, also the number of strokes, combined with the work performed, enables us not only to judge of the **quality of our Steel for wear,** but **also of the cutting qualities** of the File, and the ease (expressed in pounds) with which a given amount of work can be accomplished.

**Finally.**—Our Files **are warranted** to be **hard, well cut** and **sound.** They are exclusively used by many of the largest Railroads and Machinists in the country—and the vigorous growth of our reputation, not only for making a good article, but of **our ability to furnish a good article cheap,** is evidenced by the large number of Dealers and Jobbers who are handling our Files exclusively.

NICHOLSON FILE COMPANY, Providence, R. I.

SOLD BY HARDWARE DEALERS GENERALLY.

**NEW HAVEN NUT CO.,**

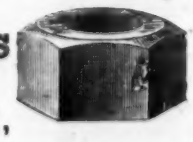


MANUFACTURERS OF

**HOT PRESSED NUTS**

Of Superior Quality of all sizes, both

HEXAGON & SQUARE,



From ¾ inch to and including 1½ inch Bolt.

Factory and Office, - - - - - - WESTVILLE, CONN

**SUPPLIES**

FOR

Railways, Machinists and Amateurs,

Gum and Leather Belting, Packings and Cotton Waste, Babbit Metal.

**FINE TOOLS**

for Machinists and Amateurs; Barnes' Foot Power Scroll Saw; Foot Lathes, all kinds. Sole Agents Baxter Steam Engine. Iron and Wood Working Machinery. Send for Price Lists.

JACKSON & TYLER,

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**PENNA. WAREHOUSING AND SAFE DEPOSIT CO.**

WAREHOUSES:

FRONT AND LOMBARD STREETS.

IRON STORAGE YARDS:

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**Schweitzer Mfg. Co.,**

57 Reade Street New York.

**CONTINENTAL LOCKS,**

Made of Wrought Iron or Brass, very superior in quality, and only an auger used in mortising.

EXCELSIOR COMPASSES.
EXCELSIOR DIVIDERS,

WITH

**STUBS' STEEL POINTS,**

Best and Cheapest Goods in the market. Sole Agents for the United States for

NEWBOULD'S FILES AND TOOLS

**French Coffee Mills.**

**NOBLE MFG. CO.,** Tools, Ship Augers, &c.

We also make a superior

**AXE.** { *"Queen of the Forest,"* / *"Wood Chopper's Pride,"* &c

**Disston's Saws.** (Largest Stock in the City).

General dealers in

**FOREIGN & DOMESTIC HARDWARE.**

*WM. BALDWIN'S*

Solid Cast Steel Carpenters' and Machinists' Hammers, Mining Sledges and Blacksmiths' Tools,

**TACKLE BLOCKS,**

**And Humphrey & Bartlett's Horse Brushes.**

**WILSON & EVENDEN'S**

PATENT

**OIL TANKS.**

*Superior to all others for Carbon and Lubricating Oils*

For descriptive circulars and prices address the manufacturers,

**Shipping Can Mfg. Co.,**

*E. F. W. WETZEL,*
*75 Warren St., New York.*

**GEO. W. BRUCE**

No. 1 Platt Street, N. Y.

Has secured the entire product of the

**INTERNATIONAL SCREW WORKS,**

in addition to his importations of the **Birmingham and Imperial Co.'s**

**IRON AND BRASS SCREWS,**

which form an unrivalled assortment of these goods, in spite of the misrepresentations of competitors.

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OFFICES FOR PROCURING

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H. HOWSON, Solicitor of Patents. | C. HOWSON Attorney Law.

Communications should be addressed to the PRINCIPAL OFFICES PHILADELPHIA.

**COX & COX,**

Counsellors at Law,

229 Broadway, NEW YORK.

Practice in cases relating to

**PATENTS and TRADE MARKS.**

Before the

Courts and Patent Office.

**Burke & Fraser,**

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*Established* 1851. *Send for Circular.*

**PATENTS,** Send for circular.

Thomas D. Stetson, No. 25 Murray St., N. Y. Solicitor of Patents, and Scientific Expert in patent cases.

# HENRY DISSTON & SONS,

# Keystone Saw, Tool, Steel and File Works,

**Front and Laurel Streets, Philadelphia.**

**Branch Works, Tacony, Philadelphia.** **Branch House, Randolph & Market Streets, Chicago, Ill.**

MANUFACTURERS OF

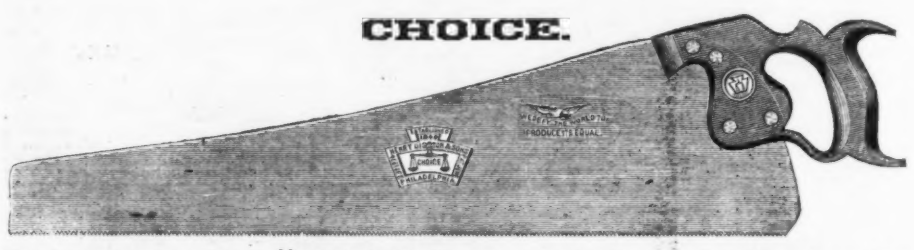
## SHEET STEEL, and all Articles made from Sheet Steel.

# SAWS OF EVERY DESCRIPTION.

**Also, FILES, TOOLS, Etc., and all kinds of Labor Saving Implements for keeping Saws in perfect order.**

**HENRY DISSTON & SONS'**
**New Patent Skew-back Hand-Saw,**

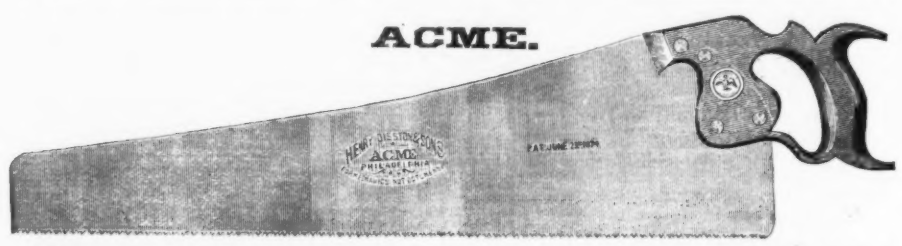
**CHOICE.**



**This Saw is the "CHOICE" of all first-class Mechanics who have used it.**

**HENRY DISSTON & SONS'**
**New Patent Skew-back Hand-Saw,**

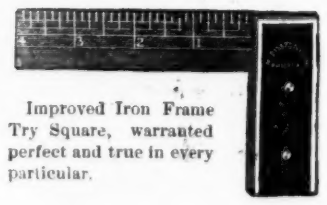
**ACME.**



**We consider these Saws to be the ACME of perfection. So say all first-class Mechanics who have used them.**

**HENRY DISSTON & SONS'**
**Patent Skew-back Hand-Saw**
**NEW No. 7.**

**Even in price and quality with our celebrated No. 7 Saw. Warranted to give satisfaction every time.**



Improved Iron Frame Try Square, warranted perfect and true in every particular.

It is singular, yet true, that although immense improvements have been made of late years, in the grinding, temper, and finish of Hand Saws, still in shape and style they much resemble the Hand Saws of centuries ago We have recently patented a Hand Saw which, we believe, combines numerous advantages over the old-style Saw, being lighter and more easy to handle, stronger in proportion to the amount of metal in the blade, and more free from tremor when in use than the ordinary Hand Saw. To these Saws are attached our new patent handles, which possess many advantages over the old style. They bring the operator closer to his work, and in some of them the blade of the saw is imbedded in the handle, imparting strength in case of an accidental blow or a fall. The Rip Saw handle is coped out to admit the thumb of the left hand, and thus give the operator unlimited power and command over the Saw when it is desirable to use both hands.

**A cheap Saw, fully guaranteed. Six tools in one. Adapted to farmers' or plantation use. A Rip and Cross-Cut Saw, Square, Rule, Straight Edge and Scratch Awl combined.**

**Hand Saw with adjustable handle. The thumb screws in the handle operate on the butt of the saw blade, and can be so adjusted as to give the blade any desired pitch.**

# New York Wholesale Prices, April 28, 1875.

## HARDWARE.

**Anvils.**
Solid Cast Steel.....₩ ℔ 14c
Wright's.....₩ ℔ gold 11c; over 250 ℔s 11½c, gold
Armitage's Mouse Hole.....gold 11c
Atkinson's.....₩ ℔ gold 11c
Eagle Anvils.....₩ ℔ 8c

**Apple Parers.**
Domestic.....
Turn Table.....
Lightning.....
Hudson's.....$7.75 ₩ doz
Reading.....
Union.....
Skeleton Paring, Coring and Slicing.....
Bay State, Paring, Coring and Slicing.....$15 00 dis 10 %
Climax Slicer.....8 00

**Augers and Bits.**
Douglass.....
Ives.....
Beecher(French,Swift&Co)} 1st quality.....dis 40&10 %
Griswold.....
Noble.....
Challenge.....
Cook's.....d's 40&10&10 %
Snell Mfg. Co.....dis 22½ @ 25 %
Jennings' Bits.....dis 10 %
Lewis' Single Twist Bits.....dis 30 %
Andrews' Bits.....dis 25 %
Griswold's Patent Bits.....dis 20 %
Expansive Bits, Clark'....small, $18; large, $30—dis 15 %
" " Ives'.....$30 @ $90—dis 30 %
" " Blake's.....$20—dis 40 %
Hollow Augers, Douglass' } dis 40 %
" " Ives'.....}
" " French, Swift & Co.....
" " Bonney's Adjustable..₩ doz $48—dis 25 %
" " Stearns' " ..₩ doz $48—dis 25 %
" " Ives' Expansive.....each $4·50—dis 40 %
" " Universal Expansive.each $4·50, dis 10 %
Gimlet Bits—Screw, $7·50; no screw, $9.....dis 20&10 %
Double Cut Gimlet Bits, Shepardson's.....dis 30 %
" " Hartwell's.....dis 50 %
" " Douglass'.....dis 30 %
" " Ives'.....dis 30 %
" " Ladd's.....dis 50&10 %
Morse's Bit Stock Drills.....dis 20 %
L'Hommedieu's Ship Augers.....dis 15 %
Watrous Ship Augers.....dis 15 %
Vaughan's Post Hole—6 in. $28 00; 7, 8 and 9 in. $25 per doz.....dis 30 %

**Axes and Tools.**
Aiken's.....dis 25 %
Nos. 42 and 45.....dis 35&10 %
Clark's.....dis 30&10 %
Stanley's Excelsior.....$18 50—dis 20&10 %

**Axes.**
Brook's.....per doz $12 00 @ 14 00 net
Hood's.....per doz $15 00 @ 16 50—dis 20 %
Hunt's.....₩ doz $12 50 @ 14 00
Collins'.....₩ doz 11 00 @ 15 50 net @ dis 5 %
H. Clark's (J. C. W. & Co.) Bronzed.....₩ doz $10 00 net
Hurd's.....₩ doz 10 50 @ 12 50
Simmons'.....₩ doz 11 00 @ 11 50
Morris'.....₩ doz 12 50 @ 13 50
Red Jacket.....₩ doz 12 00 @ 12 50
Mann's.....₩ doz 11 50 @ 13 00
Double Bitted.....₩ doz 21 50 @ 22 00
Underhill's.....₩ doz 12 00 @ 13 00
" Crown.....₩ doz 12 50 @ 13 50
John Leverett's.....
Fen Eyck.....₩ doz $11 00 @ 12 50 net

**Balances.**
Beams.....dis 35 %

**Bands.**
Plated.....new list dis 50&5 %
Iron ditto.....new list dis 25&5 %
Brass (Plated list).....new list dis 50&5 %
Oroide.....new list dis 50&5 %

**Bells.**
Hand, Light Brass.....dis 70&5 @ 70&10 %
" Extra Heavy.....dis 40&10 %
" White Metal.....dis 50&10 %
" Silver Chime.....dis 15&10 %
" Swiss.....dis 25 %
" Globe (Cone's Patent).....dis 15&10 %
Gong Abbe's.....dis 15&10 %
" Yankee.....dis 30&10 %
" Barton's.....dis 33½ %
Crank, Taylor's.....dis 25 %
" Crook's.....dis 50 %
" Cone's.....dis 10 %
" Connell's.....dis 5&10 %
Lever, Sargent's.....dis 50&10&10 %
" Taylor's.....dis 25 %
" Hart, Bliven & Mead Mfg. Co.....dis 50&10 %
Pull, " " " .....dis 50&10 %
" Brook's.....dis 5 %
" Western.....dis 25 %
Cow—Common Wrought.....dis 20&10 %
" Western.....dis 20&10 %
" " Sargent's.....dis 50&10&10 %
" Kentucky "Star".....dis 20&10 %
" " Sargent's.....dis 50&10&10 %
Dodge's Genuine Kentucky, new list—

| Nos. | 0 | 1 | 1½ | 2 | 3 | 4 | 5 | 6 | Hog. |
|---|---|---|---|---|---|---|---|---|---|
| | $12·00 | 10·00 | 9·00 | 8·00 | 6·00 | 5·00 | 3·50 | 2·50 | 5·00—dis 45 % |

" Yaw's Genuine.....dis 30 %
" Texas.....dis 33 %
Oall.....dis 15 %

**Bellows.**
Blacksmiths'.....dis 20 %
Moulders'.....dis 15 %
Hand Bellows.....dis 10 %

**Blind Adjusters.**—Domestic.....₩ doz $3—dis 20 %

**Blind Fasteners.**
Mackrell's.....dis 30 %
Van Sand's, No. 2000, $14·00; No. 3000, $19·50.....net
Washburn's Patent.....₩ gross $14 00 net
Merriman's.....new list net

**Bling Staples.**
Boardman's Patent, ¼ in. and larger.....₩ ℔ 3; c
" ⅜ in....." 42 c

**Blocks.**
Tackle, Rope and Iron Strapped, Providence Tool Co.'s list.....dis 30 %
Burr's.....dis 10 %
Stanley Rule and Level Co.....dis 25&10 %

**Bolts.**
Cast Iron Barrel, Shutter, &c.....dis 60&10 %
Cast Iron Chain.....dis 60&10&10 %
Wrought Iron Barrel.....dis 50, 10&10 %
" " Square.....dis 50, 10&10 %
" " Shutter.....dis 60&10 %
Wrought Iron Flush, Stanley's.....dis 10&10 %
" " " Sargent's.....dis 50&10&10 %
Carriage and Tire, Common.....dis 75&10 %
" " " Norway Iron.....dis 50&10 %
" " " R. B. & W.....(old list) dis 60&5 %
" " " Philadelphia, Star.....dis 55 %
" " " " Eagle.....dis 55 %
Union Nut Company, old list.....dis 60 %
Stove.....dis 25 %
" R. B. & W.....dis 25 %

**Borax.**
Borax.....1c. ₩ ℔

**Boring Machines.**
Kellogg's.....dis 15 %
Snell Mfg. Co., Rice's Patent.....dis 20 %
" " Regular.....dis 20 %
Douglas Mfg. Co.....No. 5, $3·25; with Augers, $5·00 net
" " No. 2, 4·00 " " 6 00 net
Parr's.....dis 30&10 %
Phillips' Angular, complete with Augers.....each $7 25
Morticing Machines each.....$18 00

**Bow Pins.**
Union Nut Co.....new list dis 50&10&5 %
Hotchkiss'.....dis 50 @ 55 %
Humason, Beckley & Co.'s.....dis 50&10&5 %
Sargent & Co.'s.....dis 50&10&10 %

**Braces.**
Barber's Patent.....dis 40&5 %
C. S. Backus.....dis 44&10 %
Wilson Mfg. Co.....dis 40 %
Bradford's Patent.....dis 50 %
Noble's Patent.....dis 40&5 %
Ives' Novelty.....dis 40&7½&10 %
" Hamden.....dis 45&10 %
Common Ball.....dis 15&10 %

**Brackets.**—Shelf.....dis 60&10 @ 65&10 %

**Bright Wire Goods.**.....dis 65&10&10 %

**Buff Rings.**—Union Nut Co., new list, dis 50&10&5 %
Sargent's,.....dis 60&10 %
Hotchkiss'.....2½ in., ₩2·25 net

**Bung Hole Borers.**
Common and Ring.....dis 20&10 %
Ives' Tap Borers.....dis 10&10 @ 25 %
Enterprise Mfg. Co.....dis 30 %

**Butchers' Cleavers.**
Humason & Beckley Mfg. Co.....dis 20&10 %
Bradley's.....dis 25 %
Beatty's.....dis 20 %

| | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| | $19·00 | $21·50 | $24·00 | $27·00 | $30·00 | $33·50 | $36·50 | $40·00 |

Hart Mfg. Co.....dis 45&10 %

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| | $25·25 | $29·75 | $34·25 | $38·75 | $43·25 | $43·50 | $54·00 |

**Butts.**
Wrought Brass.....dis 30 %
Cast Brass.....dis 20 %
Common Cast, not Drilled.
Fast Join', Narrow,.....new list, dis 30&10 %
" Broad " dis 40&10 %
" " Jap'd.....dis 35&10 %
Loose Joint, Narrow and Broad.....dis 50&10 %
" " " Jap'd.....dis 45&10 %
Parliament Butts and Mayer's Hinges.....dis 40&10 %
Loose Pin, all kinds.....dis 45&10 %
Drilled and Wired.
Fast Joint, Narrow.....new list, dis 25&10 %
" Broad " dis 35&10 %
" " Jap'd.....dis 30&10 %
" " " with Acorns.....dis 30&10 %
Loose Joint.....dis 45&10 %
" Jap'd.....dis 40&10 %
" with Acorns.....dis 40&10 %
Parliament and Mayer's Hinges.....dis 35&10 %
Loose Pin, all kinds.....dis 40&10 %
Wrought Iron.
Fast Joint, Narrow, Lt. and Regular.....dis 30&10 %
" Broad.....dis 35&10 %
Loose Joint, Narrow and Broad.....dis 35&10 %
Table Butts, Back Flaps, &c.....dis 30&10 %
Inside Blind, Regular.....dis 30&10 %
" Light.....dis 40&10 %
Loose Pin, Wrt.....dis 35&10 %
Blind Butts, Parker.....dis 60 @ 60&10 %
" Palmer.....dis 40 %
" Seymour.....dis 55&10 %
" Shepard.....dis 60 @ 60&10 %
" Lull & Porter.....dis 60 %
" Nicholson.....dis 45&10 %
" Butler.....dis 60,5&10 %
Blind Butts, Garretson, No. 1.....dis 60 @ 60&10 %
Blind Butts, Clark's, Nos. 1, 2 and 5.....dis 60 @ 60&10 %
Blind Butts, Clark's No. 3.....dis 60&10 @ 65&10 %
" " Nos. 2, 4, 4½, 6, 8, 10.....dis 40 %
The American Spiral Spring Butt Co.....dis 20 %
Standard.....dis 30&5 %

**Caps—Percussion,** per 1000.
G. D.....37 @ 40c
Ely's E. B.....1-4s, 56c.; 1-10s, 65c., gold
" Double Waterproof, 1-4s, $1·45; 1-10s, $1·53½c., gold
Colt's.....1-10s 80c gold

**Carpet Sweepers.**
Union.....each $2 75 net
Welcome.....each 2 75 net

**Cartridges.**—Metallic.....dis 50&10 %

**Caps.**—Horse and Carry.....dis 30&10 %
Cotton.....dis 10&10 %
Wood.....dis 15&10 %

**Carpet Stretchers.**
P. S. & W.....per doz $2 00; dis 40&5 %
Sargent's.....per doz $2·88—dis 50&10&10 %

**Cast Iron.**
Bed.....dis 30&10 @ 40 %
Plate and Shallow Socket.....dis 40&10 @ 50 %
Deep Socket.....dis 33½ %

**Cattle Lead Ropes.**.....new list dis 60&5 %

**Chain.**
Engines Coil.....net gold

| ₩ ℔ | .12 | 9 | 8½ | 8 | 7¾ | 7½c |
|---|---|---|---|---|---|---|
| Nail | ¼ | 5-16 | ⅜ | 7-16 | ½ | |

Trace, 6½-10-2.....by the cask, ₩ pair, gold 55c
Trace, 7-10-2.....by the cask, ₩ pair, gold, 62c
German Halter Chain.....dis 20 % gold
German Coil.....dis 10 % gold
Galvanized Pump Chain.....₩ ℔ 12c
Jack Chain, Iron.....dis 50&10 %
" Brass.....dis 60&10 %

**Chalk.**
White.....₩ gross, 57c net
Red.....₩ gross, 90c net
Blue.....₩ gross, $1·00 net
White Crayons.....₩ gross, 16½c net

**Chisels.**
Socket Framing, Douglass, Extra.....dis 60&10&10 %
" " Crossman.....dis 50&15&10 %
" " Hart Mfg. Co.....dis 60&10 %
" " Merrill.....dis 60&10 %
" Firmers, Douglass, Extra.....dis 60&10&10 %
" " Crossman.....dis 50&10&10 %
" " Hart Mfg. Co.....dis 60&5 %
" " Merrill.....dis 60 %
Socket Corner.....dis 60&10 %
Tanged Firmers.....dis 40&10 @ 50 %
Butcher's.....$5·50 to £ gold
Newbould's.....$5·50 to £ gold
Spear & Jackson's.....$5·50 to £ gold

**Clamps.**
Cabinet.....dis 60&10 %
Lambert's.....dis 30 %
Providence Tool Co.....dis 10 %

**Clips, Axle.**
Norway or Best.....dis 40 %
Superior.....dis 50 %
"Star," Superior Philadelphia.....dis 45&5 %

**Coal Shovels.**
Edgar's Pat. "Gem," Short and Long H'dled.....dis 15 %
Iron Handled.....₩ doz, ₩ 85 @ 1 25
Wooden Handled.....₩ doz, 1 00 @ 2 00

**Coal Hods.**—Smith, Parma & Co.....dis 15 @ 25 %

| | 14 | 15 | 16 | 17 | 18 | inch. |
|---|---|---|---|---|---|---|
| Japanned | $6·00 | 6·25 | 6·75 | 7·50 | 8·00 | per doz. |
| Galvanized | 9·50 | 10·00 | 10·75 | 11·50 | 12·50 | " |

Morning Glory Funnel Hods—

| | No. | 15 | 16 | 17 | |
|---|---|---|---|---|---|
| Japanned | | $9·00 | 10·50 | 12·00 | per doz |
| Galvanized | | 13·00 | 14·50 | 16·00 | " |

Sidney Shepard & Co.'s new list.....dis 10 %

**Cockeroves.**...1¼ in., 28c.; 1½ in., 33c.; 1¾ in., 37c. net

**Cocks.**
Brass Racking.....dis 33½ %
Lock and Globe.....dis 30½ %
Lever Bibbs.....dis 38½ %
Ale and Beer.....dis 2 & 10 @ 25&10 %

**Coffee Mills.**
Board and Box.....dis 15 @ 20 %
Increase Wilson's.....dis 20 %
Selleior's Pat.....$9·50, $10·50—dis 25 %
American (Enterprise Mfg. Co.).....dis 20 %
French Steel.....dis 15 %
The Swift.....dis 25 %

**Compasses and Dividers.**
Bemis & Call Co.'s.....dis 35&10 %
Cook's.....dis 15 %
Excelsior.....dis 30 %
Peck Stow & Wilcox.....dis 25 %
Miller's Patent.....dis 25 %

**Coopers' Tools.**
Bradley's.....dis 15 @ 20 %
Chas. E. Little.....dis 20 @ 25 %
Swan & Brombacher.....dis 15 @ 20 %

**Corkscrews.**.....dis 25 %

**Corn Knives and Cutters.**
Bradley's.....dis 10 %

**Crow Bars.**
Cast Steel.....₩ ℔ 11c. net
Iron, steel points.....₩ ℔ 6c

**Crucibles.**—Gautier & Co.....₩ No. 5 45c

**Curling Irons, &c.**
⅝, ⅞, 1 in., $1·80, $2·00, $2·40.....dis 10 %
Curling Tongs.....₩ doz $6 50—dis 15 %
Pinching Irons.....₩ doz 7 50—dis 20 %

**Curry Combs.**
Hotchkiss' and Kellogg's, Iron and Brass....dis 80&10 %
Fitch's (List of No. 240, $1).....dis 20&10 %
Rubber.....₩ doz, $9·00—dis 15 %

**Curtain Pins.**—Silvered Glass.....old list dis 52½ %

**Cutlery.**
American Table } Meriden } New list Jan. '75, dis 25 %
American Pocket } Cutlery Co } .....dis 25 %
Am. Pocket—Humason & Beckley mfg. Co....dis 20&10 %

**Dippers.**
Britannia.....per doz 7·50—dis 30 %; by bbl. dis 33½ %
Cocoa, Plain.....per doz $3·25—dis 20 %
" Rimmed.....per doz 3·75—dis 2·5 %

**Dog Collars.**
Embossed Gilt.....dis 20 %
Leather.....dis 20 %
Brass.....dis 25 %

**Door Springs.**
Gray's.....$7·50 ₩ doz—dis 50&10 %
Torrey's Patent.....$7·50 ₩ doz—dis 55 %
Johnson's.....per doz $8 00 @ 4 00
Palmer's Japanned No. 6.....₩ doz $5·00
" Coppered " " 6·00
" Silvered " " 8·00
Challenge.—
Japanned.....No. 9, per doz $4·00
" No. 7, " 5·00
" No. 6, " 6·00
Gem.—No. 1 large, Japanned.....per doz $4·00
" No. 2 medium.....per doz 3·50
" No. 3 small.....per doz 3·00
Barker's Concealed.....dis 12½ %

**Drawing Knives.**
Crossman's No. 1.....dis 50&15&10 %
Douglass, Extra.....dis 60&10&10 %
Hart Mfg. Co., No. 1.....dis 60 %
Merrill.....dis 60&10 %
Bradley's.....dis 25 %
Adjustable Handle.....dis 15 %

**Drills.**
Blacksmiths'.....each $2 00 net
Breast, P. S. & W.....dis 15&10 %
" Miller's Falls.....dis 25 %
" Aiken's.....$2·50; 4·00, dis 45&10 %
" Hotchkiss'.....dis 10 %
" Wilson's.....dis 10 %
Ratchet, Merrill's.....dis 20 %
" Ingersoll's.....dis 25 %
" Whitney's.....dis 30 %
" Moore's Triple Action.....dis 20 @ 25 %

**Drill Chucks.**—The Danbury..each 10·00, dis 20 @ 25 %

**Beach Patent (Morse).**.....dis 15 %

**Egg Beaters.**

| Monroe's..... | 8 in. | 10 in. |
|---|---|---|
| Per doz | $8·00 | 9·00 |

Monroe's.....dis 10 %
Dover.....₩ doz $6·00—dis 10 %
National.....₩ doz $4·50—dis 20 %
Peerless.....₩ doz $4·00—dis 10 %

**Emery.**
Genuine Chester—Regular Nos.....₩ ℔ 6c
" Flour and FF.....₩ ℔ 4½c
Washington Mills—Regular Nos.....₩ ℔ 8c
" Flour.....₩ ℔ 8c

**Enameled and Tinned Ware.**
Kettles.....dis 30 @ 40 %
Sauce Pans.....dis 25 %
Glue Kettles.....dis 20 @ 25 %
Tinned Saucepans.....dis 25 %

**Escutcheons.**
Door Lock.....Same discounts as Door Locks
Brass Thread.....dis 60&10 %
Wood.....dis 25 %

**Faucets.**
Fenn's.....dis 50 %
" Cork Stops.....dis 40 %
Star.....dis 55&10 %
Frary's Patent Petroleum.....dis 15&10 %
Taylor's Pattern " .....dis 30&10 %
Wood and Metallic " .....dis 40 %
Wood, Cork Lined.....dis 60&10 %
Enterprise Mfg. Co., Self-Measuring.....dis 20 %

**Feiloe Plates.**.....₩ ℔ 15c; dis 25 %

**Files.**
American File Co.....$5 00 to £ currency—dis 10 @ 15 %
Nicholson.....new list, Jan. 1, 1875, net
Hartford File Co.....$5 50 to £ currency—dis 10 %
L. B. Heller & Co.....$5 00 to £ currency, dis 10 @ 15 %
" Western".....5 00 to £ net
Rothery's.....$5 to £ currency
Black Diamond.....$5 to £ currency, dis 10 %
J. & Riley Carr.....5 25 to £ gold
" Horse Rasps.....5 50 to £ gold
Stubs'.....$ 50 @ 9 00 to £ gold
Butcher's.....5 25 to £ gold
Walter Spencer & Co.'s "Diamond".....5 25 to £ gold
Spear & Jackson's.....5 00 to £ gold
Jowitt's.....5 00 to £ gold
Newbould's.....5 25 to £ gold
W. K. & C. Peace's "Imperial".....5 ½ to £ gold
R. Ibbotson.....5 00 to £ gold
Fisher's.....4 75 to £ gold
Goodlad's.....4 00 to £ gold
Moss & Gamble.....$ 25 @ 5 50 to £ gold
Thos. Turner & Co. (Peter A. Frasse & Co.).....5 00 to £ gold
" " Horse Rasps.....5 25 to £ gold
"Philo Sheffield," P. T. Co.....5 00 to £ gold
Limet & Co. (French).....5 00 to £ gold

**Fluting Machines.**
Mrs. Coles' Pony..4 in., $4·75; 5 in., $5; 6 in., 5·50; 7 in., $6
Knox, with 4-inch Rolls.....4 25 each net
" " 5 " .....4 75 each net
" " 7 " .....7 00 each net
O. K.....6 50 each net
Peerless, 4-inch Rolls.....4 00 each net
" 5 " " .....4 75 each net
Excelsior, No. 1.....4 75 each net
" No. 2.....6 50 each net
Diamond.....7 50 each net
Champion, 4 inch rolls.....$6 00 each net
" 4 inch rolls.....$5 00 each net
Climax 7-inch Rolls.....8 00 each net
" 4½ " .....6 50 each net
Empire.....4 00 each net
Eureka, No. 1, 7-inch Roll.....8 00 each net
" No. 2, 5-inch Roll.....6 00 each net
K. F. M., 4½-inch Roll.....5 50 each dis 15 %
" 4-inch Roll.....4 00 each dis 15 %
Myers' Fashion Fluter, 4½ inch Rolls.....3 00 each net
" Convex Brass Fluter, Sad Iron attachment..$1·75
Domestic Fluter.....$1·75 each net
Fairy, Self-Heater.....00 each net
Geneva Hand Fluter.....$15 00 per doz net

**Fluting Scissors.**.....dis 25&10 %

**Forges.**
"Empire" (W. P. Kellogg & Co.).....dis 20 %

**Forks.**
Hay, Manure & Spading.....dis 33½ %
Plated A. I.....dis 50 %

**Fry Pans.**
Burnished, P. S. & W., new list.....dis 45 %

| ₩ doz..... | $3·00 | 3·75 | 4·25 | 4·75 | 5·25 | 6·00 | 7·00 | 8·00 | 9·00 |
|---|---|---|---|---|---|---|---|---|---|
| No. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

Smith, Burns & Co., "Excelsior" Polished.....dis 35 %

| ₩ doz..... | $3·70 | 4·00 | 4·70 | 5·30 | 6·00 | 7·00 | 8·00 | 9·00 |
|---|---|---|---|---|---|---|---|---|
| No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

**Gas Stoves.**
Tiffi & Howard.....dis 20 %

**Gauges.**
Marking.....dis 45&10 %
Wire.....dis 10 %
" Smith's Patent.....per doz $18 00, dis 40 %

**Gimlets.**
Nail and Spike.....dis 25&10 %
Double Cut, Shepardson's.....dis 30 %
" " Ives'.....dis 25 %
" " Douglass'.....dis 30&10 %

**Grind Stone Fixtures**
Sargent's Patent.....dis 65&10 %
Reading Hardware Co.....dis 70&10 %
Hart Mfg. Co.'s.....dis 60&5&10 %

**Hammers.**
Emmet Hammer Co.'s Handled.....dis 25 %
" Sledge & Stone..₩ 3 25 @ 50c net
Humason & Beckley Mfg. Co.....dis 16⅔&10 %
Maydole's, new list.....dis 5 @ 7 %
Cheney's.....net
Verree.....dis 5 %
Yerks & Plumb.....dis 12½ %
Magnetic Tack.....dis 25&10 %
Warner's.....dis 10 %

**Hand Cuffs and Leg Irons.**
Torrey's Hand Cuffs, $4 00 per pair.....} dis 25 %
" Leg Irons $6 50 per pair.....}
Providence Tool Co.'s Hand Cuffs $15 per doz } dis 10 %
" " Leg Irons 25 " }

**Handles.**
Wrought Chest.....dis 60&10 %
Surface Chest.....dis 65&10&10 %
Flush Chest.....dis 60&10&10 %
Lifting.....dis 60&10 %
Coffin.....dis 30&10 @ 60&10 %
Saw and Plane.....dis 20&10 %
Hammer and Hatchet.....dis 10 %
Greensboro', Axe, Pick, Hammer, &c.....dis 10 %
North Carolina Handle Co.....dis 10 %
Woolworth Axe, Pick and Sledge.....dis 10 %
Brad Awl.....per gross $3 50—dis 20&10 %
Hickory Firmer Chisel, ass'td.....dis 45 %

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| No. | | | largest | | 5 | 25 | dis | 20&10 | % |
| " | " | " | | " | 6 | 50 | dis | 20&10 | % |
| Apple | " | " | ass'td | " | 6 | 00 | dis | 20&10 | % |
| " | " | " | large | " | 7 | 50 | dis | 20&10 | % |
| Socket | " | " | ass'td | " | 8 | 50 | dis | 2.&10 | % |
| " | Framing | " | " | " | 7 | 00 | dis | 20&10 | % |
| File | | | " | " | 4 | 00 | dis | 20&10 | % |
| Auger | | | " | " | 6 | 50 | dis | 20&10 | % |
| " | | | large | " | 8 | 00 | dis | 20&10 | % |

Patent Auger, Ives'.....per set $1 25—dis 10&10 %
" " Douglass'.....per set $1 25—dis 10&10 %
" " Swan's.....per set $1 00—dis 10&10 %

**Hangers.**
Barn Door.....dis 65&10 %
"Anti-Friction" (Rider, Wooster & Co.).....dis 30 %
Novelty.....dis 30 %

**Harness Snaps.**
Henshaw's.....dis 25&10 %
Judd's.....dis 40 %
Fitch's (Bristol).....dis 10 %
Hotchkiss'.....dis 10 %
Andrews'.....dis 25 %
Sargent's.....dis 50&10 %
New York Wire.....dis 20&20 %

**Hatchets.**—Isaiah Blood.....dis 15 %

| | | | | | |
|---|---|---|---|---|---|
| Shingling, Nos. | 1 | 2 | 3. | ₩ doz | $7 25 | 8 00 | 8 75 |
| Claw, " | 1 | 2 | 3. | ₩ doz | 7 75 | 8 50 | 9 25 |
| Lathing, " | 1 | 2 | 3. | ₩ doz | 7 50 | 8 00 | 8 50 |

Hunt's.....dis 10 %

| | | | | | |
|---|---|---|---|---|---|
| Shingling, Nos. | 1 | 2 | 3. | ₩ doz | $7 25 | 8 00 | 8 75 |
| Claw, " | 1 | 2 | 3. | ₩ doz | 7 75 | 8 50 | 9 25 |
| Lathing, " | 1 | 2 | 3. | ₩ doz | 7 50 | 8 00 | 8 50 |

Hurd's.....dis 25 %

| | | | | | |
|---|---|---|---|---|---|
| Shingling, Nos. | 1 | 2 | 3. | ₩ doz | $8 00 | 8 50 | 9 00 |
| Claw, " | 1 | 2 | 3. | ₩ doz | 9 00 | 9 50 | 10 00 |
| Lathing, " | 1 | 2 | 3. | ₩ doz | 8 00 | 8 50 | 9 00 |

Newark's Edge Tool Co.'s.....dis 25 %

| | | | | | |
|---|---|---|---|---|---|
| Shingling, Nos. | 1 | 2 | 3. | ₩ doz | $6 50 | 7 00 | 7 50 |
| Claw, " | 1 | 2 | 3. | ₩ doz | 7 25 | 7 75 | 8 25 |
| Lathing, " | 1 | 2 | 3. | ₩ doz | 6 50 | 7 00 | 7 50 |

Yerxes & Plumb.....dis 12½ %

| | | | | | |
|---|---|---|---|---|---|
| Shingling, Nos. | 1 | 2 | 3. | ₩ doz | $7 00 | 7 50 | 8 00 |
| Claw, " | 1 | 2 | 3. | ₩ doz | 7 50 | 8 00 | 8 50 |
| Lathing, " | 1 | 2 | 3. | ₩ doz | 7 00 | 7 50 | 8 00 |

Simmons'.....dis 15 %

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Shingling, Nos. | 0 | 1 | 2 | ₩ doz | $7 50 | 8 00 | 8 50 | 9 00 |
| Claw, " | | 1 | 2 | 3. ₩ doz | | 9 00 | 9 50 | 10 00 |
| Claw, " | | 1 | 2 | 3. ₩ doz | | 8 00 | 8 50 | 9 00 |
| Broad, " | | 1 | 2 | 3. ₩ doz | | 9 00 | 10 00 | 12 00 |
| " | | 4 | 5 | 6. ₩ doz | | 14 00 | 16 00 | 18 00 |
| " | | 7 | 8. | ₩ doz | | 20 00 | 23 00 | |

Elephant.....dis 25 %

| | | | | | |
|---|---|---|---|---|---|
| Shingling, Nos. | 1 | 2 | 3. | ₩ doz | $8 00 | 8 50 | 9 00 |
| Claw, " | 1 | 2 | 3. | ₩ doz | 9 00 | 9 50 | 10 00 |
| Lathing, " | 1 | 2 | 3. | ₩ doz | 8 00 | 8 50 | 9 00 |

J. P. Verree & Co.....dis 5 %

| | | | | | |
|---|---|---|---|---|---|
| Shingling, Nos. | 1 | 2 | 3. | ₩ doz | $7 00 | 7 50 | 8 00 |
| Claw, " | 1 | 2 | 3. | ₩ doz | 7 50 | 8 00 | 8 50 |
| Lathing, " | 1 | 2 | 3. | ₩ doz | 7 00 | 7 50 | 8 00 |

Underhill's.....dis 10 %

| | | | | | |
|---|---|---|---|---|---|
| Shingling, Nos. | 1 | 2 | 3. | ₩ doz | 7 25 | 8 00 | 8 75 |
| Claw, " | 1 | 2 | 3. | ₩ doz | 7 75 | 8 50 | 9 25 |
| Lathing, " | 1 | 2 | 3. | ₩ doz | 12 00 | 11 00 | 13 00 |

**Hinges.**
Gate, Western.....₩ doz $6·25—dis 60&10 %
" N. E.....₩ doz 11·25—dis 6.&10&10 %
" N. Y. State.....₩ doz 7·20—dis 60&10 %
Rolled Plate.....dis 65&10 %
" Raised.....dis 65&10 %
Wrought Strap and T.....dis 35&10&5 %
Providence Plate. } 6 and 8 in. 11c ₩ ℔ } .....dis 25 @ 30 %
} over 8 in. 9½c ₩ ℔ }
Screw Hook and Strap.....} ⅝, ¾, 1 and 1¼ in. 7c } .....net
} 1½ to 3 in. 6c }
Heavy Welded Hook.....} ⅝ to 1 in., 8½c } .....net
} 1¼ in. & up, 6c }
Screw Hook and Eye.....} ⅝ to 1 in., 9½ } .....net
} 1¼ in. 11½ }
Screw Hook and Eye, Sargent's—

| | ⅝ | ¾ inch. |
|---|---|---|
| Per doz pairs | $4·75 | 7·25 |

10·75—dis 65&10&10 %

**Hoes.**
Solid Shank, C. S.....₩ doz $8 00—dis 35 %
Socket.....₩ doz 9 00—dis 35 %
Riveted Eye.....₩ doz 5 00—dis 35 %
Grub.....dis 35 %
Planters.....net
Scovill.....add 33½ %
Scovill Patt'n.....net @ dis 5 %
Lane's C. 2. Crescent, American Pattern.....list net
" " " Scovil Pattern.....add 10 %

**Hooks.**
Bird Cage.....dis 60&10 @ 70&10 %
Cotton.....dis 50 %
Belt.....dis 55 @ 60 %
Bench—Skinner's.....per doz $8 00, dis 30&10 %
Bench—Hotchkiss' ₩3 00 ₩ doz.....dis 10 %
Bench—Weston's No. 1, $8·00; No. 2, $7·00 per doz net
" —McGill's.....$3 00 per doz, dis 10 %
Clothes Line, Harness, Wardrobe, Hat and Coat, Ceiling.....} Hart's list.....dis 60&10&10 %
} Sargent's list.....dis 6.&5&10 %
} Reading list.....dis 35&10 %
Wrought Staples and Hooks and Staples.....dis 70&10 %
Wire Screw Hooks and Eyes.....dis 65&10&10 %
Grass.....dis 2 %
Whittretree—Patent.....dis 30 %
Hooks and Eyes—Malleable Iron.....dis 60&10&10 %
" " Brass.....dis 60&10&10 %

**Horse Nails.**

| Nos. | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|
| American Pressed....₩ ℔ | 32c | 30c | 30c | 29c | 29c | 29c |
| Ausable.....” | 30c | 27c | 26c | 24c | 23c | 22c |
| " P't'd & Pol'd..” | 31c | 28c | 28c | 26c | 25c | 24c |
| " " & Blued..” | 32c | 29c | 27c | 26c | 25c | 24c |
| Brundage.....” | 28c | 26c | 24c | 23c | 22c | 21c |
| Buffalo Forged.....” | 31c | 28c | 26c | 25c | 24c | 23c |
| Globe, P't'd & Pol'd...” | 31c | 29c | 26c | 25c | 24c | 23c |
| National, Pointed and Polished, Ex. Fin.....” | 33c | 29c | 27c | 25c | 24c | 23c |
| New London U. B.....” | | 29c | 27c | 26c | 25c | 24c |
| " " Great Western.....” | | | 27c | 25c | 24c | 23c |
| Perkins' Finished.....” | 31c | 28c | 26c | 25c | 24c | |
| Putnam.....” | 32c | 28c | 26c | 25c | 24c | 23c |
| Vulcan, P't'd & Blued.” | 33c | 30c | 28c | 27c | 26c | 25c |

Star Brand, 16c.; Morgan.....14c
Putnam.....3000 lbs., dis 5 %
Ausable, Am. Pressed, Perkins, Globe, National and New London.....1000 lbs., dis 5 %
Vulcan.....1000 lbs., dis 7½ %
Vulcan and Brundage.....500 lbs., dis 5 %

**Horse Shoes.**
Burden.....₩ keg, $5 87½
R. I. Horse Shoe Co., Perkins Pattern.....₩ keg, 5 62½
" " " R. I. Pattern.....₩ keg, 6 00
Mule Shoes.....₩ keg, 6 61½

**Kettles.**
Brass.....₩ ℔ 45c net
Enameled.....dis 30 @ 40 %

**Knives.**
Ames' Butcher Knives.....dis 30 %
" Shoe " .....dis 15 %
" Bread " .....₩ doz $1·50—dis 15 %
Hay and Straw, "Wadsworth's".....dis 20 %
Lothrop's Cocoa Handle Lap Bolster Butcher Knives.....dis 25 %

**Knobs.**
Carriage.....dis 60&10 %
Base—Common.....net
" Plush Tip.....dis 10 %
" Elastic End, No. 8.....dis 30&10 %
Door, Mineral.....₩ doz $2·25 } dis 45&5&2 %
" Por. Jap'd.....₩ doz 3·00 }
" " Plated.....₩ doz 7·00 }
" " Por.....₩ doz 7·50 }
Furniture, Plain.....75c gross inch, dis 10 %

**Ladles.**
Melting, Hart's.....dis 55&10 %
" Sargent's.....dis 50&10 %
" Reading.....dis 15&10 %

**Lanterns.**
Tubular.....No. 0, $12 50—dis 15 %
Peerless.....No. 5, per doz $11·75—dis 10&10 %
Brady's Patent.....dis 10 & 10 %
Ætna.....dis 10 & 10 %
Yankee.....dis 10 & 10 %
De Begue.....dis 10 & 10 %

**Lard Presses.**
Draw Cut, 14 inch.....each $65 00—dis 20 %

**Lemon Squeezers.**
Porcelain Lined.....per doz $7 00, dis 15 %
Eureka, Tinned.....per doz, $10·00 dis 10 %

**Lines.**
Linen Fish.....dis 20 %
Cotton Chalk.....dis 40 @ 45 %
Sil. Lake Chalk.....Nos. 0, 1, 2, 3, 4, 5, 6, 6·50, 7, 7·50, dis 20 %
Mason's.....dis 20 %
Galvanized Wire Clothes.....per doz $9·00—dis 10 %

**Locks and Latches.**
Cabinet—Gaylord.....dis 25 %
" Eagle.....dis 25 %
Trunk " .....new list dis 25 %
Langstroth & Crane, Round Key.....dis 40 %
" " Flat Key.....dis 33½ %
Barnes & Deitz.....dis 25 %
Continental.....dis 15 %
Shepardson's.....dis 20 %
American Lock Co.....dis 33½ %
Plate.....dis 25 %
Yale Lock Co.....dis 40 %
Sargent & Greenleaf.....dis 20 %
Trenton } Rev'd list of Jan. '75
Branford } dis 45&5 %.
Norwich } 2 % extra for cash.
Russell & Erwin }
Norwalk }
Nashua }
Mallory, Wheeler & Co. }
P. & F. Corbin }
Parker & Whipple }
Jacobus & Nimick Mfg. Co. }
Padlocks, Russell & Erwin.....} List of Jan. '75.
" Mallory, Wheeler & Co.....} dis 45&5&

**Tinners' Tools and Machines.**
P. S. & W.....list net

**Traps.**
Newhouse.....dis 20 %
Peck, Stow & Wilcox.....
Blake's Patent.....new list dis 25 %
Mouse, Wood Chocker.....₩ doz holes, 15 @ 16c
" Patent Chocker (Union Nut Co.).....₩ doz holes 16 @ 18c net
" Round, Wire.....₩ doz $1 60 to 2 00 net
" Square, " .....₩ doz 2 00 to 2 50 net
" Cage, " .....₩ doz 2 50, dis 10 %

**Trowels.**
Lothrop's Brick and Plastering.....dis 10 %
Disston's Plastering.....dis 12½ %
Disston's Brick.....dis 12½ %
Rose's Brick.....dis 5 %
Bradeo' Brick.....gold, dis 10 %
Worrall's Brick and Plastering.....dis 20 %
Garden.....dis 25 %

**Triers.**
Butter and Cheese.....dis 25 %

**Ventilators (Window).**
Nickel and Gilt.....per dozen $16 00 @ 19 00

**Vises.**
Trenton Vises, Solid Box.
30 to 160 lbs.....16c
160 and over.....19c
Peter Wright's.....₩ ℔ 15½c. gold
Wilson's Solid Box.....dis 15 @ 20 %
31 to 160 lbs.....18c
160 and upward.....22c
Wilson's Parallel.....dis 30 %
Sargent's " .....dis 50&10&10 %
Backus & Union, Parallel.....dis 25 %
Buffalo, Parallel.....new list dis 25 %
Fisher & Norris' Double Screw Parallel.....dis 15&10 %
Trenton Parallel.....dis 15 %
Merrill's Parallel.....dis 15 %
Parker's.....dis 20 %
Stephens' Parallel.....dis 15 @ 20 %
Bonney's Saw Filers.....per doz $20—dis 33½ %
Stearn's Saw Filers.....per doz $20—dis 33½ %

**Wheel Barrows.**
Canal (Pugsley & Chapman).....new list dis 10 %
Coal, Garden and Stone (Pugsley & Chapman).....dis 25

**Well Wheels.**
Revised list.....dis 60&10 %

**Wire.**
Brass and Copper.....dis 10 %
Bright and Annealed.....Nos. 0 @ 18 dis 40 @ 45 %
" " " 19 @ 26 dis 47½ @ 52½ %
" " " 27 @ 30 dis 52½ @ 57½ %
Coppered.....0 @ 18 dis 35 @ 40
Galvanized, Nos. 9 to 9.....₩ ℔ 8½ @ 9c net
Galvanized, Nos. 10 to 18.....market list dis 10 @ 15 %
Tinned.....dis 25 @ 30 %
Cast Steel.....dis 15 @ 20 %
Tinned Broom Wire.....dis 30 @ 35 %
Galvanized Telegraph, Nos. 8 and 9.....₩ ℔ 9c @ 9½c
Galvanized Telegraph, Nos. 10 and 11.....₩ ℔ 10c @ 10½c
" " 12.....₩ ℔ 10½c @ 11c
Annealed Fence, Nos. 8 and 9.....dis 40 @ 45 %
" Grape, " 10 to 14.....dis 40 @ 45 %
Fence Staples.....₩ ℔ 8 @ 8½ %
Stubs' Steel Wire.....$7 00 to £ gold
Judd's Picture Wire.....dis 50

**Wrenches.**
American Adjustable.....dis 45 %
Baxter's Adjustable "S".....dis 20 %
" Diagonal.....dis 20 %
Collins & Co.'s.....dis 45 %
Cues' Genuine.....dis 40&5 %
" Pattern (Wrought).....dis 50&10 %
" " (Malleable).....dis 40&10 %
Lindsay's Patent.....dis 25 %
Taft's Pattern.....dis 70&10 %
Davis Patent Dupex.....new list dis 25 %
Bemis & Call's Patent Combination.....dis 20&5 %
" " Merrick's Pattern.....dis 25&2½ %
" " Brigg's Patent.....dis 15&10 %
Aiken's Pocket.....per doz $10 00—dis 45&10 %

**Wringers.**

| | Less than 2 doz | 2 doz lots |
|---|---|---|
| Providence | ₩ doz $64 00 | $62 00 |
| Reliance | ₩ doz 61 00 | 59 00 |
| Universal—Extra | ₩ doz 64 00 | 62 00 |
| Noveity | ₩ doz 64 00 | 62 00 |
| Sherman | ₩ doz 64 00 | 62 00 |
| Eureka (Friction) | ₩ doz 60 00 | 58 00 |

## TIN WARE AND TRIMMINGS.

STAMPED TIN WARE, dis 5 %.
COMMON STAMPED WARE, &c.
Bucket Covers.

| | ½ | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| Quarts | | | | | |
| Inch | 4½ | 5 3-16 | 6 5-16 | 6½ | 7 11-16 |
| Per gross | $2 00 | 2 60 | 3 40 | 4 25 | 5 75 |
| Quarts | 6 | 8 | 10 | 12 | |
| Inch | 8¾ | 9¼ | 9½ | 10 9-16 | |
| Per gross | $6 50 | 8 00 | 8 50 | 11 50 | |

Cake Box Covers.

| | Small. | Medium. | Large. |
|---|---|---|---|
| Inch | 11½ | 12½ | 13½ |
| Per gross | $15 00 | 18 00 | 22 00 |

Pot Covers.

| | | | | | | |
|---|---|---|---|---|---|---|
| Inch | 7¾ | 8¼ | 8¾ | 9¼ | 9¾ | 10¼ |
| Per gross | $5 75 | 6 00 | 6 25 | 6 75 | 7 25 | 8 25 |
| Inch | 10¾ | 11¼ | 11¾ | 12¼ | 12¾ | 13¼ |
| Per gross | $8 75 | 9 50 | 10 00 | 13 00 | 13 75 | 16 50 |

Pie, Dinner or Scolloped Plates.

| | | | | | |
|---|---|---|---|---|---|
| Inch | 6 | 7 | 8 | 10 | 11 |
| Per gross | $4 00 | 4 50 | 5 50 | 8 50 | 10 50 |

Deep Pie Plates.

| | | |
|---|---|---|
| Inch | 9 | 10 |
| Per gross | $8 50 | 10 50 |

Jelly Cake Pans.

| | | |
|---|---|---|
| Inch | 9 | 10 |
| Per gross | $7 50 | 10 00 |

Coffee Pot Covers.

| | | | | | | |
|---|---|---|---|---|---|---|
| Plain | 1½ | 2 | 3 | 4 | 5 | 6 qts. |
| Inch | 3 | | | | | |
| Per gross | $1 15 | 1 40 | 1 60 | 2 00 | 2 75 | 3 00 |
| Rimmed | 2¾ | 3 | 3½ | 4 | 4½ | inches. |
| Per gross | $2 25 | 2 50 | 3 00 | 3 50 | 4 00 | |

T. K. Breasts only.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Inch | 7½ | 8 | 8½ | 9 | 9½ | 10 | 10½ | 11 | 11½ |
| Per gro. | $6 00 | 6 50 | 6 75 | 7 25 | 7 75 | 9 50 | 10 00 | 12 00 | 13 00 |

Grater Plates.

| | | |
|---|---|---|
| Sheet | ½ | 1 |
| Per gross | $5 00 | 6 00 |

Scolloped Cake Pans.

| | Small. | Large. |
|---|---|---|
| Without Tubes | per gross, $8 00 | 11 50 |
| With Tubes | " 10 50 | 14 00 |

Stamped Square Pans.

| | | |
|---|---|---|
| No. | ½ | |
| Per gross | $7 50 | 14 50 |

Common Square Pans (One Sheet).
Per gross.....$11 50
Milk Skimmers (Plain or Pierced).
Per gross.....$4 00
Lettered Plates.

| | | |
|---|---|---|
| Inch | 5½ | 6 |
| Per gross | $5 25 | 6 00 |

Steamer Bottoms.
Add $1 per gross, or 10c. per doz. to list of Pot Covers.
Tin Stove Pipe Rings.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Inch | 4 | 4½ | 5 | 5½ | 6 | 7 | |
| Plain | per gro. $4 00 | 4 50 | 5 00 | 5 50 | 6 00 | 7 00 | |
| Jap'd or Burn'd | " 6 00 | 6 50 | 7 00 | 8 00 | 9 50 | 10 00 | |

Coffee Boiler Lips.

| | Small. | Large. |
|---|---|---|
| To Rivet | per gross, $0 80 | 1 10 |
| To Solder | " 1 25 | |

DEEP STAMPED AND RETINNED WARE, dis 25 %.

**Plain Stamped Water Dippers.**

| | ½ pint. | Pint. | Quart. | quarts. | 2½ quarts. |
|---|---|---|---|---|---|
| Per doz | 90 | 1 15 | 1 50 | 1 85 | 2 50 |

**Retinned Milk Pans.**

| Qts. | ½ | 1 | 1½ | 2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ₩ doz. | 1 20 | 1 50 | 1 75 | 2 00 | 2 25 | 3 15 | 3 50 | 3 85 | 4 75 | 5 25 | 5 75 |

Dipper Bowls, Plain Stamped—

| | | | | |
|---|---|---|---|---|
| Pints | 1 | | Quarts | 1 2 2½ |
| Per doz. | 90 | 75 | Per doz | 1 00 1 25 1 75 |

Dipper Bowls, Retinned—

| | | | | | | |
|---|---|---|---|---|---|---|
| Pints | ½ | ¾ | 1 | Quarts | 1 | 2 2½ |
| Per doz. | 75 | 95 | 1 05 | Per doz | 1 40 | 1 75 2 25 |

**Pans.**
Dish Pans, Retinned Deep—

| Quarts | 7 | 8 | 10 | 14 | 17 | 21 | 30 |
|---|---|---|---|---|---|---|---|
| Per doz | 8 50 | 9 50 | 11 00 | 13 00 | 16 00 | 19 00 | 27 00 |

JAPANNED TIN WARE, dis 5 %.

| | | | | | | |
|---|---|---|---|---|---|---|
| Canisters, Common | Pound | ½ | 1 | 2 | 3 | |
| | Per gross | $10 50 | 15 00 | 24 00 | 30 00 | |
| Canisters, Hinged | Pound | 1 | 1½ | 2 | 3 | 4 |
| | Per gross | $19 00 | 25 00 | 32 00 | 37 00 | 42 00 |
| Canisters, Square | Pound | 3 | 4 | 6 | 8 | 12 16 |
| | Per doz | $3 00 | 4 25 | 5 00 | 5 75 | 8 00 9 00 |
| Candlesticks, Japanned | No. | 1 | | | | 2 |
| | Per gross | $8 00 | | | | 7 00 |
| Cake Boxes, Round | per nest, | $5 25 | | | | |
| Square | per nest, | 4 25 | | | | |
| Chamber Pails, Japanned | | | | | | |
| Nos | | 2 | 3 | 4 | 5 | |
| Green, per doz | | $8 00 | 9 00 | 11 00 | 13 00 | |
| Oak | " | 9 00 | 11 00 | 12 00 | 13 50 | |
| Dust Pans, Corrugated | per gross, | $22 00 | | | | |
| Box Graters | per gross, | $3 75 | | | | |
| Molasses Cups | Pint | ½ | 1 | 2 | 4 | |
| | Per gross | $13 00 | 16 00 | 28 00 | 42 00 | |
| Lunch Boxes, per doz | 7 in $2 00; 8 in. $2 50 | | | | | |
| Pepper Boxes Japanned | ₩ gross small, $3 00; large, $4 00 | | | | | |
| Toy Banks, House | No. | 1 | 2 | | | |
| | Per gross | $7 00 | 5 50 | | | |
| Toy Banks, Gothic | No. 1, $6 00, No. 2, 4 00 per gross | | | | | |
| Toy Cups, Straight | No. | 1 | 2 | 3 | | |
| | Per gross | $3 75 | 2 75 | 2 75 | | |
| Toy Cups, Flaring | No. 1, $4 25; 2, $3 75 ₩ gross | | | | | |
| Toy Pails, Covered | No. 1, per gross $4 00 | | | | | |
| Toy Rattles | per gross, $2 00 | | | | | |
| Trunks, Wire Handled | per nest (5) $1 75 | | | | | |
| Spittoons, Tin | per gross, $7 | | | | | |

PLANISHED TIN WARE, dis 25 @ 30 %.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Planished Coffee Pots, Round. | | | | | | | | |
| Each | 60 | 75 | 85 | 95 | 1 15 | 1 25 | 1 30 | 1 40 |
| Pints | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Planished Tea Pots, Round. | | | | | | | | |
| Each | | | 70 | 80 | 95 | 1 05 | 1 15 | 1 25 |
| Pints | | | 2 | 3 | 4 | 5 | | 6 |
| Planished Tea Pots, Oval. | | | | | | | | |
| Each | | | 70 | 80 | 90 | 1 05 | 1 15 | 1 40 | 1 75 |
| Pints | | | 1 | 2 | 3 | 4 | 5 | 6 | 8 |

Planished Pepper Boxes, No. 1.....per doz., $1 62
Planished Flour Dredges, No. 3, $2 10; 4, 2 45 ₩ dozen.
Planished Round Coffee Biggins.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Pints | 3 | 3 | 4 | 5 | 6 | 8 | |
| Each | $1 00 | 1 10 | 1 20 | 1 40 | 1 60 | 2 00 | |
| Planished Oval Coffee Biggins. | | | | | | | |
| Pints | 2 | 3 | 4 | 5 | 6 | 8 | |
| Each | $1 15 | 1 25 | 1 40 | 1 60 | 1 80 | 2 25 | |

Planished Oval Chafing Dishes, Imperial Covers.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Inch | 10 | 12 | 14 | 16 | 18 | 20 | 24 |
| Each | $7 25 | 8 00 | 9 25 | 11 00 | 13 00 | 15 00 | 19 00 |

Planished Oval Chafing Dishes, Low Covers.

| | | | | | | |
|---|---|---|---|---|---|---|
| Inch | 10 | 12 | 14 | 16 | 18 | 20 |
| Each | $3 25 | 4 25 | 5 20 | 6 20 | 7 80 | 9 25 |

Planished Low Dish Covers.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Inch | 10 | 11 | 12 | 14 | 16 | 18 | 20 |
| Each | $ 70 | 80 | 1 00 | 1 25 | 1 50 | 2 00 | 2 75 |

Planished Imperial Dish Covers.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Inch | 10 | 11 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
| Each | $1 55 | 1 70 | 2 00 | 2 60 | 3 15 | 3 45 | 4 00 | 5 45 | 6 30 |

Planished Etnas, on Stands.

| | | | |
|---|---|---|---|
| Pints | 1¾ | 3 | 4 5 |
| Each | $0 90 | 1 00 | 1 20 1 50 1 75 |

Planished Liquor Mixers.....Nos. 0 1 2
Per doz $2 00 2 10 2 45

Planished Oval Melon Molds.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Nos | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Each | 60 | 65 | 70 | 80 | 90 | 1 00 | 1 15 | 1 35 |

Planished Oval Tumbler Warmers.
To fit 1, 2, 3, and 4 O. G. Urns.....each, $2 50
Planished Oval O. G. Urns.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Nos | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Each | $4 00 | 5 45 | 6 30 | 7 00 | 7 75 | 9 25 | 11 25 | 12 50 | 15 00 |

Planished Round Urns.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Nos | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Each | $4 20 | 4 85 | 5 45 | 6 30 | 7 75 | 9 00 | 11 00 | 14 25 |

Planished Round Oyster Dishes, (Complete)..Nos. 1 2
Each $2 10 2 60
Planished Oyster Dish Plates.....Nos. 1 2
Each $0 25 0 30
Oyster Dish Covers.....Nos. 1 2
Each $0 30 0 35

*Tea Pot Handles*—P. S. & W.....dis 30 %
Stow s Patent Hollow Tea Pot Handles.
No. 1, Small 4½ inches.....per gross, $11 50
No. 2, Medium, 5¾ " " 12 50
No. 3, Large, 6½ " " 13 50
No. 4, Ex. Large 7¼ in., for Wash Pitchers &c....." 18 00
Solid iron. Tin Tipped.
No. 10, Small, 4¾ inches.....per gross, $9 00
No. 15, Medium, 5¾ " " 9 50
No. 20, Large, 6½ " " 10 75
Stow's Patent Hollow Tea Pot Handles, Adamantine Bronze—P. S. & W.
No. 12, Bronzed and Tin-Tipped.....per gross, $13 50
*Saucepan Handles. Or Ben Malleable Iron.*
P. S. & W.....dis 30 %
Japanned.
No. 1, 5⅛ inches long.....per gross, $3 50
No. 2, 6 " " 3 75
No. 3, 6¾ " " 4 00
No. 4, 7¾ " " 4 25
No. 5, 8 " " 4 50
No. 6, 9 " " 4 75
Tinned.
No. 1, 5⅛ inches long.....per gross, $4 25
No. 2, 6 " " 4 50
No. 3, 6¾ " " 4 75
No. 4, 7¾ " " 5 00
No. 5, 8 " " 5 50
No. 6, 9 " " 5 75
Japanned.....per lb., 16
Tinned.....20
*Iron Kettle Ears* (P., S. & W.).....dis 45 %
Half gross pairs in a package.
Tinned.

| | | | | | | |
|---|---|---|---|---|---|---|
| Nos | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Per gross pairs | 88c | $1 00 | 1 50 | 1 75 | 2 10 | 2 75 | 3 75 | 4 50 |

Black.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Nos | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Per gross pairs | 75c | 88c | $1 35 | 1 50 | 1 75 | 2 25 | 2 75 | 4 00 |

Tinned Tea Kettle Ears.

| | | | |
|---|---|---|---|
| Nos | 4 | 5 | 6 |
| Per gross pairs | $1 75 | 2 10 | 2 75 |

*Extra Heavy Tinned Kettle Ears*—French Pattern.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Nos | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Per gross pairs | $1 00 | 1 25 | 1 50 | 1 75 | 2 00 | 2 50 | 3 00 |

*Malleable Iron Kettle Ears for Coal Hods*
P., S. & W.....dis 30 %
No. 10 Small.....₩ ℔, Tinned 2.c; Black, 16c
No. 30 Medium.....₩ ℔, " 20c; " 16c
No. 30 Large.....₩ ℔, " 20c; " 16c
No. 40 Extra Large.....₩ ℔, " 20c; " 16c
In cases of 100 lbs. each.
*Milk Can or Boiler Handles*—(P. S. & W.) 4½ in..dis 25 %
Plain, 8c.; Japn'd, 9c.; Tinned, 15c. per lb.; Malleable Clips or Ears to match, Tinned.....30c per lb.
*Toilet Ware Handles*—1½ inches (P. S. & W.).....dis 35 %
Plain with drilled holes, per lb.....9c
Plain with Cast " " .....8c
*Plumbers' Scrapers*—(P. S. & W.).....dis 25 %
Extra quality, length 6 in., per doz.....$4 00

## METALS.

**IRON.**—DUTY Bars, 1 to 1½ cents per lb., Sheet, Band, Hoop and Scroll, 1¼ to 1¾ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton; Polished Sheets, 3 cents per lb.; Wrought Scrap, $8 per ton; Cast Scrap, $6 per ton. Railroad, 70 cents per 100 lbs. Boiler and Plate, 1½ cents per lb.

**Pig Iron**—AMERICAN.

| | | |
|---|---|---|
| Foundry No. 1 | ₩ ton, | $28 00 @ |
| Foundry No. 2 | " | 26 00 @ |
| Gray Forge | " | 24 00 @ 26 00 |
| White and Mottled | " | |
| SCOTCH. | | |
| Coatness | " | |
| Glengarnock | " | $1 00 @ |
| Eglinton | " | $1 00 @ 32 00 |

**Bar Iron.**
Am. Refined, at mill.....nominal.....

**Rails.**
Welsh, gold.....₩ ton,
American, at works, currency.....48 00 @ 53 00
Old Rails.....29 00 @ 30 00

**Scrap.**
Wrought Scrap.....34 00 @ 35 00

**Bar Iron from Store.**
Common Iron.
¾ to 2 in. round and square.....
1 to 6 in. x ⅜ to 1 in.....₩ ton $60 00 @ 62 50
Refined Iron.
¾ to 2 in. round and square.....
1 to 6 in. x ⅜ to 1 in....." 65 00 @ 67 50
Shafting Iron—2½ to 4 in....." 70 00 @ 72 50
1 to 6 in. x ¼ and 5-16....." 72 50 @ 92 50
Rods—5-16 to ⅝ round and square.." 80 00 @ 82 50
Bands....." 87 50 @ 140 00
Hoops—⅝ to 2 in.....
Swedish Iron.
Ordinary sizes.....
Plow size.....

**Sheet Iron.**

| | Common American and English. | R. G. American. | R. G. English. |
|---|---|---|---|
| Nos. 10 to 20 | ₩ ℔ 4¼ | 5¼c | 5½c |
| 21 to 24 | " 4½ @ 4¾c | 5¾c | 5¾c |
| 25 to 26 | " 4¾c | 5¾c | 5¾c |
| 27 | " 5c | 5¾c | 6c |
| 28 | " 5¼c | 5¾c | 6½c |
| Galvanized, Ia to 24, prime | ₩ ℔ 9 | 2d quality | ₩ ℔ 8c |
| " 21 to 24 | " " 10 | " | " 9c |
| " 25 to 26 | " " 11 | " | " 10c |
| " 27 | " " 12 | " | " 11c |
| " 28 | " " 13 | " | " 12c |

Patent Polished.....₩ ℔ 14c
Russia, Nos. 8 to 26.....17c
" Stained, No. 1.....16c
Belgian.....10c
One piece Corrugated Sheet Iron Elbows.

CHARCOAL IRON

| ⅛ | ¼ | ⅜ | ½ | ⅝ inch. |
|---|---|---|---|---|
| $2 50 | 3 50 | 4 50 | 5 25 | 6 50 per doz. |

RUSSIA IRON.

| | | | | |
|---|---|---|---|---|
| 4½ | 5 | 5½ | 6 | 7 inch. |
| $5 00 | 7 00 | 9 50 | 12 00 | 14 00 per doz. |

**COPPER**—DUTY. Pig, Bar and Ingot, 5c.; old copper, 4 cents ₩ ℔; Manufactured (including all articles of which copper is a component of chief value) 45 % ad valorem.
American Ingot.....₩ ℔ 22½ @ 23c
English " .....

SHEATHING, BRAZIERS COPPER, BOLTS, &c.
Braziers Copper, ordinary sizes, over 16 oz., per square foot.....35c ₩ ℔
Braziers' Copper, ordinary sizes, 16 oz. and over 12 oz., per square foot.....35c "
Braziers Copper, 12 oz. per square foot and lighter.39c. "
Circles less than 84 inch in diameter.....35c ₩ ℔
Circles, 84 inch diameter and over.....39c. "
Segment and Pattern Sheets.....35c. "
Locomotive Fire Box Sheets.....33c. "
Sheathing Copper, over 12 oz. per sq. ft.....31c. "
" 12 oz. ₩ sq. ft. and lighter..39c. "
Bolt Copper.....33c. "
Copper Bottoms, 32 c. ₩ ℔.....net
No Copper in Sheathing except 14x48 inches, and not to exceed 34 oz. to the square foot.

O'NEILL'S PATENT PLANISHED COPPER.
14x48.
14 and 16 oz. and heavier.....36c. By the case, c. ₩ ℔
12 oz. and lighter.....39c. " " 38c. "
*Boiler Sizes.*
7 in., 14x82. 8 in., 14x56. 9 in., 14x60
14 and 16 oz. and heavier.....38c. By the case, 37c. ₩ ℔
(And all sizes not over 20 inches wide.)
30x60
14 and 16 oz. and heavier.....40c. ₩ ℔
12 oz.....43c. "

TINNING.
x48, by the case.....8c. ₩ sheet
x48, less than case.....10c. "
Boiler Sizes, 7 and 8 inch.....12c. "
" 9 inch.....15c. "
Other sizes not larger than 30x60.....2½c. ₩ sq.
Larger than 30x60.....5c. "

**LEAD**—DUTY Pig $2 per 100 lbs.; old Lead, 1½ cent per lb.; Pipe and Sheet, 2½ cents per lb.
Spanish.....6¾ @ 7c gold
German Refined.....6¾ @ 6¾c gold
English.....6¾c. gold
American.....6¾ @ 6¾c gold
Bar.....dis 10 %.....9c.
Pipe.....dis 10 %.....9c.
Tin Lined Pipe.....dis 10 %.....10½c.
Sheet.....dis 10 %.....9½c.
Shot.....dis 10 %.Drop, 10c. Buck. 11c.

BABBITT METAL.
W. P. U.....₩ ℔ 8¼ @ 9c
A. 25c.; B. 21c.; C. 15c.; D 13c., ₩ ℔.

**SOLDER**.....No. 1, 15c; No. 2, 18½ @ 14c

**STEEL**.—DUTY: Bars, Ingots, Sheets and Coils, valued at 7 cents per lb., or under, 2¼ cents; over 7 cents, and not above 11, 3 cents per lb. over 11, 3¾ cents per lb. and 10 % ad val. Railway Bars 1¼ cents per lb. Railway Bars, in part Steel, 1 cent per lb. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

**American Cast Steel.**
Tool.....15 @ 16c
Spring.....10c
Homogeneous.....13½c
Tire.....12¼ @ 13½c
Machinery (round and square).....10 @ 11c
File.....11c
Sheet.....14 @ 16c
Saw Plate, mill and mulay.....14 @ 16½c
Saw Plate, gang and X cut.....13 @ 14c
" circular as to size.....18 @ 30c

**Chrome Steel.**
Tool.....₩ ℔ 20 @ 21c
Tool, extra fine....." 40 @ 75c
Spring.....₩ ℔ 12c and upward
Machinery.....₩ ℔ 14c
Hammer....." 15c.
Gun or Homogeneous....." 16c

**English Steel.**—payable in gold, net.
Best Cast.....₩ ℔ 17½c
Extra Cast....." 18½c
Round Machinery, Cast.....₩ ℔ 10¼ @ 11½c
Swaged, Cast....." 19½c
Best Double Shear....." 17½c
Blister, 1st quality....." 14½c
" 2d quality....." 13 c
German Steel, Best....." 11½c
do 2d quality....." 10½c
3d quality....." 9½c
Sheet Cast Steel, 1st quality....." 17½c
" " 2d quality....." 14½c
" " 3d quality....." 12½c
File Steel, Flat and ½ Round....." 12½c
" Square and Round....." 12½c
" Taper 3 and 3¼ inch....." 18c
Taper 3 and 3¼ inch....." 16c

**SPELTER**—DUTY: In Pigs, Bars and Plates, $1 50 per 100 lbs.
Silesian, cash.....6¾ @ 7c., gold
American " .....7 @ 11c., currency

**TIN**—DUTY: Plates, Sheets, Tagger and Terne, 1½c per lb.; Electro-galvanized Plates, 2 cents per lb.; Manufactures of, not enumerated, 35 per cent. ad val. Bare, Block and Pigs, free. Banca, subject to duty of 10 per cent.
Banca.....₩ ℔ 25c., gold
Straits.....₩ ℔ 21c., gold
English.....₩ ℔ 20½c., gold

CHARCOAL TIN PLATE.

| | |
|---|---|
| I C 10x14, Prime Charcoal | 11 25 @ 11 50 |
| 12x12, " | 11 75 @ 12 00 |
| 14x20, " | 12 00 @ 12 25 |
| I X 10x14, " | 13 50 @ 13 75 |
| 12x12, " | 14 25 |
| 14x20, " | 14 50 @ 14 75 |
| D C 12½x17 " | 10 75 @ 11 00 |
| D X 12½x17 " | 15 00 @ 13 25 |
| For each additional X add | 2 25 |

CORE TIN PLATE.

| | Best | 2d Quality. | Ordinary. |
|---|---|---|---|
| I C 10x14 | $ 9 75 @ 10 25 | 9 50 @ 9 75 | 9 00 @ 9 25 |
| I C 12x12 | 10 50 @ 10 75 | 10 00 | |
| I C 14x20 | 10 50 @ 11 00 | 10 50 | |

TERNE PLATE.

| | Prime Char. | 2d qual. | Coke. |
|---|---|---|---|
| I C 14x20 | $10 00 @ 10 25 | 9 25 @ 9 75 | 8 25 @ 9 00 |
| I X 14x20 | 12 50 | | |
| I C 20x28 | 20 50 @ 21 00 | 19 00 @ 20 00 | 17 50 @ 18 00 |
| I X 20x28 | 25 50 | | |
| I C 20x200 | 23 75 | | |

**ZINC**.—DUTY: Pig or Block, $1 50 per 100 lbs. Sheet 2½c. ₩ ℔.
Sheet.....cask 10½c
" .....open 10¾c

## Old Metals.

*(Dealers' Selling Price.)*

| | |
|---|---|
| Copper | @ 20 |
| Yellow metal | 14 @ 15 |
| Brass | 13 @ 14 |
| Heavy Composition | 17 @ 18 |
| Old lead, solid | 6 @ 6¼ |
| Tea lead | 5 |
| Wrought iron | 1½ @ 1¾ |
| Sheet iron | 0¾ @ |
| Cast iron | 1 @ 1½ |
| Machinery iron | 1¼ @ |
| Zinc | 5 @ 5½ |
| Pewter, No. 1 | 17 @ |
| " No. 2 | 10 @ 12 |
| Spelter | 5 @ |

## Paints, Oils, etc.

**Paints.**

| | |
|---|---|
| Black, lamp—Coach Painters | ₩ ℔ 30c |
| " " Ordinary | 15c |
| " Ivory Drop, fair | 12c |
| " " best | 20c |
| Black Paint, in oil | kegs, 8c.; asst'd cans, 11 c |
| Blue, Prussian, fair to best | 50 @ 75c |
| " " " in oil | 35 @ 60c |
| " Chinese, dry | 35c |
| " Ultramarine | 25 @ 30c |
| Brown, Spanish | 1½c |
| " Van Dyke | 9c |
| Carmine, 40 | $12 00 |
| Green, Chrome | 15 @ 22c |
| " in oil | 18 @ 22c |
| " Paris | good, 30c; best, 40c |
| " " in oil | " 30c " 45c |
| Mineral Paints | 1¼ @ 4c |
| Orange Mineral | 14c |
| Red Lead, American | 9¼c |
| " English | 10½c |
| " Venetian (N. C.) dry | 2¼c |
| " " in oil | asst'd cans, 11c; kegs, 8½c |
| " Indian, dry | 10c |
| Rose Pink | 12c |
| Sienna, American, Raw | 4c |
| " " in oil | 16 @ 20c |
| " Raw | 15 @ 25c |
| Umber, Burnt | 4 @ 8c |
| " " in oil | 16 @ 21c |
| " Raw | 3½ @ 7½c |
| " " in oil | 16 @ 22c |
| Vermillion, Chinese | 1 37 gold |
| " English | 1 65 " |
| " Trieste | |
| " American, Common | 22c |
| White Lead, American, pure dry | 10c |
| " " in oil | 11c |
| White, Paris, English, prime | in bbls. 2½ @ 3c |
| Yellow Ochre, French | 2½ @ 2½c |
| " " in oil | asst'd cans, 11c; kegs, 8½c |
| " " Vermont | In casks 1½c |
| " Chrome | 17 @ 22c |
| " in oil | 18 @ 23c |
| Zinc White, American No. 1 dry | 9c |
| " " 1, in oil | 11c |
| " French (Paris) | 11 c |
| " " in oil | 12 c |

**Oils.**

| | |
|---|---|
| Linseed Raw | ₩ gal. casks, 71c. bbl., 73c |
| " Boiled | " 76c. " 76c |
| Whale, Crude | " |
| " Bleached Winter | " 80c |
| Sperm, Crude | " 1 65 |
| " Winter unbleached | " 1 85 |
| " bleached | " 1 90 |
| Seal, Extra Refined | " |
| Lard, Pure Winter | " 1 30 |
| " Spring | " 1 20 |
| Cotton Seed, Crude | " 60c |
| " Southern Yellow | " 65c |
| " White | " |
| Neatsfoot, Winter | 70c @ $1 10 |
| Natural Lubricating | 58c @ 40c |

**Sundries.**

| | |
|---|---|
| Asphaltum | 8c |
| Benzine | ₩ gal. 16c |
| Chalk | 1½c |
| " Block | |
| Dryer, Patent, Am'n | asst'd cans, 10½c.; kegs 9c |
| " English | " 11c.; 9c |
| Flocks | |
| Frostings | 50c |
| Glue, White | 33 @ 47c |
| " Sheet | 30c |
| Glaziers' Points, Zinc | 9c |
| Gum, Copal | 55c |
| " Damar | 25c |
| " Shellac, English | 85c |
| " " " dark | 75c |
| Litmarge | 10c |
| Pumice Stone, selected Lumps | 4 @ 6c |
| " powdered | 4c |
| Putty in bladders | 3½c |
| " in bulk | 3c |
| Rotton Stone, soft, English | 8c |
| Spirits Turpentine | 40c |
| Whiting, Spanish | 1c |

**Glass.**
*French Window*—1st, 2d, 3d, and 4th qualities. Per box of 50 feet.

SINGLE THICK.

| SIZES. | I. | II. | III. | IV. |
|---|---|---|---|---|
| 6 x 8 to 10 x 15 | $7 50 | $6 75 | $6 25 | $5 75 |
| 11 x 14 to 16 x 24 | 8 50 | 7 75 | 7 25 | 6 50 |
| 18 x 22 to 20 x 30 | 10 75 | 9 75 | 8 75 | 7 75 |
| 15 x 36 to 24 x 30 | 12 25 | 10 75 | 9 00 | |
| 26 x 28 to 24 x 36 | 13 00 | 11 50 | 9 75 | |
| 26 x 36 to 26 x 44 | 14 50 | 13 25 | 10 75 | |
| 26 x 46 to 30 x 50 | 15 00 | 14 00 | 11 25 | |
| 30 x 52 to 30 x 54 | 16 00 | 14 75 | 12 00 | |
| 30 x 56 to 34 x 56 | 17 25 | 15 50 | 13 50 | |
| 34 x 58 to 34 x 60 | 18 25 | 17 25 | 15 00 | |
| 36 x 60 to 40 x 60 | 20 75 | 16 75 | 17 25 | |

DOUBLE THICK.

| SIZES. | I. | II. | III. | IV. |
|---|---|---|---|---|
| 6 x 8 to 10 x 15 | $12 00 | $11 00 | $10 00 | $9 25 |
| 11 x 14 to 16 x 24 | 13 75 | 12 50 | 11 75 | 10 50 |
| 18 x 22 to 20 x 30 | 17 25 | 15 75 | 14 00 | |
| 15 x 36 to 24 x 30 | 19 75 | 17 25 | 14 50 | |
| 26 x 28 to 24 x 36 | 21 00 | 18 50 | 15 75 | |
| 26 x 36 to 26 x 44 | 23 25 | 21 25 | 17 25 | |
| 26 x 46 to 30 x 50 | 24 00 | 22 50 | 18 00 | |
| 30 x 52 to 30 x 54 | 25 75 | 23 25 | 19 25 | |
| 30 x 56 to 34 x 56 | 27 75 | 25 00 | 21 75 | |
| 34 x 58 to 34 x 60 | 29 25 | 27 75 | 24 00 | |
| 36 x 60 to 40 x 60 | 33 25 | 30 00 | 27 75 | |

Sizes above—$12 00 per box extra for every 5 inches.
An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 32 inches in length, and not making more than 84 united inches, will be charged in the 84 united inches bracket
Discount 40&10 @ 50 %.


# PRATT & CO.,
## Hardware & Iron Merchants, Buffalo, N. Y.
Manufacturers of the Superior Brand,
## BUFFALO FORGED HORSE NAILS.
These Nails are superior, being made with new and improved machinery and actually hammered from the very best brands of **Norway Iron.**

**Orders solicited from the Trade.**
GEORGE B. WALBRIDGE & CO., New York Agents.

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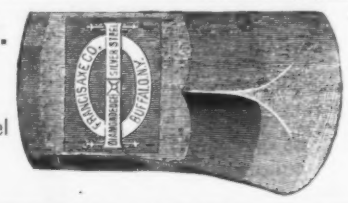
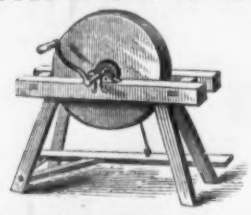
Diamond Edge Silver Steel
## AXES.




"George Washington

## Grindstones, Emery, &c.

**Walter R. Wood,**
**GRINDSTONES.**



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388 to 406 East 107th st., N. Y.,
The largest manufacturers in the world of
Arkansas, Washita and Genuine Turkey Oil Stone.
Also, *Hindostan, Sand* and *other Stone.*
Send for circular. Orders solicited from the trade.

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Upon which to run the same, of all kinds.
EMERY Emery Cloth, Mill Stone EMENT. TRADE MARK. DIAMOND Tools, Oil Stones,
Soapstone Register Borders.
For particulars, address,
**UNION STONE CO.,**
6 Exchange and 26 Devonshire Streets, Boston, Mass.

THE LEHIGH VALLEY
**Emery Wheel Co.,**
Weissport, Penn.
Manufacturers of
"LEHIGH" Emery Wheels and Machines.
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**Rocky Mountain Vermilion Paint**
is "Nature's Compound" of Copper, Mercury, Lead and Iron. A pure Oxide of Metals, containing no earthy matter, hence we claim and are prepared to *prove* that it is the Best and Cheapest Paint in the market. Properly mixed, we will guarantee it to cover double the surface and wear twice as long as ordinary paints. It will not Peel, Scale, Crack or Blister, though subjected to high degrees of heat. It will effectually Prevent the Corrosion of Metals, even in mid ocean. Warranted superior to red lead or any other lead, for any and all purposes for which paint is required. Please send for circulars.
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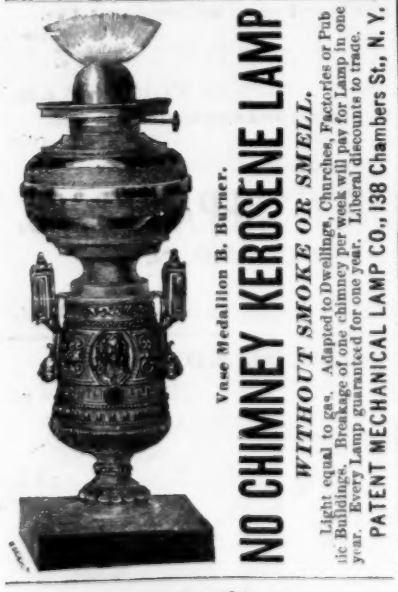

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*WITHOUT SMOKE OR SMELL.*
Light equal to gas. Adapted to Dwellings, Churches, Factories or Public Buildings. Breakage of one chimney per week will pay for Lamp in one year. Every Lamp guaranteed for one year. Liberal discounts to trade.
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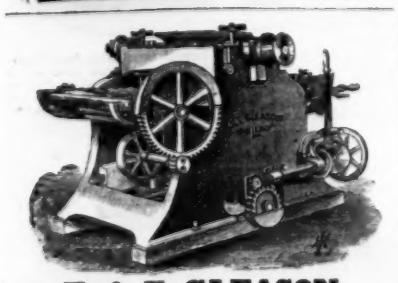

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Manufacturers of
IMPROVED WOOD TOOLS.
27 Haydock St., Philadelphia.

# L. COES'
Genuine Improved Patent
# SCREW WRENCHES.

Manufactured by
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**Worcester, Mass.**

Established  in 1839.

Registered March 31, 1874.

We invite the particular attention of the trade to our New Straight Bar Wrench, *widened*, full size of the larger part of the so called "reinforced or jog bar." Also our enlarged jaw, made with ribs on the inside, having a full bearing on the front of bar (see sectional view), making the jaw fully equal to *any* strain the bar may be subjected to.

These recent improvements in combination with the nut inside the ferrule firmly screwed up flush, against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.

We would also call attention to the *fact*, that in 1869 we made several *important* improvements (secured by patents), on the old wrench previously manufactured by L. & A. G. Coes which were *at once closely* imitated and sold as the *Genuine* Wrench by certain parties who seem to rely upon *our* improvements to keep up their reputation as manufacturers, and although the *fact* of their imitating our goods may be *good* evidence that we manufacture a superior Wrench, we wish the trade *may not be deceived* on the question of *originality*. Trusting the trade will fully appreciate our *recent* efforts, both in improvements on the Wrench and in the adoption of a Trade Mark, we would caution them against imitations. None genuine unless stamped

"L. COES & CO."

**Warehouse, 97 Chambers St., & 81 Reade Sts., N. Y.**
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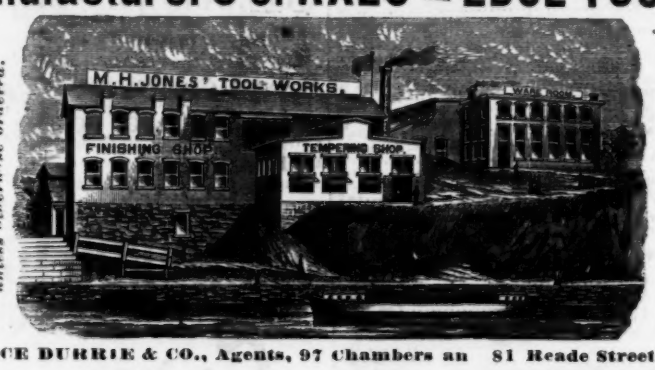


*All goods stamped and labeled* M. H. JONES & CO. *unless otherwise ordered.*

*Sole right to the use of the TENEYCK AXE MFG. CO.'S Trade Mark.*

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MANUFACTURERS OF
## HAMMERED,
Hammer Pointed, Polished & Blued
## HORSE NAILS,
FROM
BENZON IRON.
Orders promptly filled at lowest market rates.
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# GLOBE NAIL COMPANY,
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## Pointed, Polished & Finished Horse Shoe Nails
Recommended by over 20,000 Horse Shoers.
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Is superseding all others. It will save your time, save your ice, save your refrigerator, save your money. It shave more rapidly than a Crusher, and splits as true as a saw. The blade is of the best English Steel, carefully tempered and plated to prevent rust. Address orders,
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CARR'S POSITIVE CIRCULATING
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THE ONLY UPRIGHT STEAM RADIATOR MADE WHICH HAS A POSITIVE CIRCULATION.
ALSO
WROUGHT AND CAST IRON PIPE, BRASS WORK &c.
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SEND FOR DESCRIPTIVE CIRCULAR & PRICE LISTS.

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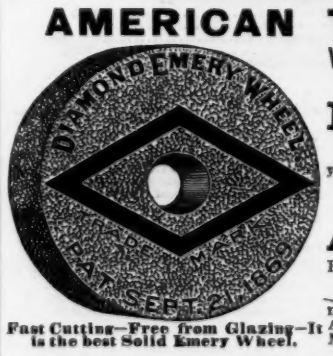


Prices: 10x1, $2·90; 14x2, $9·75; 18x2¼, $20·00; 24x3, $42·00.
All other sizes at proportionate prices. State diameter of Holes in your orders for Wheels.
MANUFACTURERS OF
PATENT EMERY WHEEL MACHINERY,
**And Automatic Knife Grinders**
For the rapid and perfect grinding of Planer, Paper Cutting, Leather Splitting and other long Knives.
These goods are unsurpassed for elegance of design, workmanship, capacity and durability. First premium awarded by American Institute, N. Y., 1870 and '73; Medal and Diploma by M. C. M. A., Boston, 1874.
Fast Cutting—Free from Glazing—It is the best Solid Emery Wheel.

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Of Superior Quality made to order.

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All our goods are manufactured from patent faced iron plates; they have a smooth face and bright finish.

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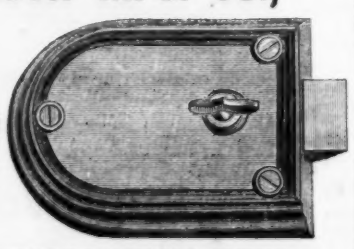
## Locks & Latches,

Comprising

**Store Door Locks, Night Latches, Drawer, Desk and Pad Locks,**

All of which are furnished with



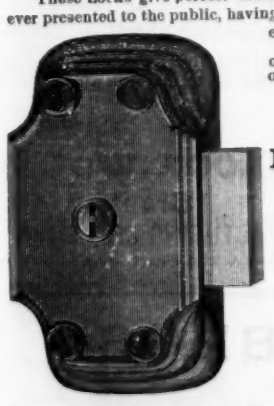
**SMALL, FLAT, AMERICAN STERLING METAL KEYS,**

Which are stronger than steel, *and cannot be affected by rust,* and will remain bright and clear under all ordinary circumstances.

A candid examination will convince the most unbelieving, that for simplicity, durability, convenience, and safety, they challenge comparison with any now before the public. Being made entirely by new and expensive machinery, especially constructed to manufacture them, *they will rival the best made Locks in Finish and perfect operation.*

These Locks give perfect satisfaction, because they are the safest, cheapest and most durable Lock ever presented to the public, having *thirty-five* finely finished Brass Tumblers in each Door and twenty-eight in each Drawer Lock, each one being finely false notched.

Each tumbler bearing on the key at two different points while locking or unlocking, without the aid of springs, which cannot be said of any other patent Tumbler Locks in use.



THE LOCKS ARE FITTED TO THE KEYS,

**And not the Keys to the Locks.**

**Hence Counterfeit Keys cannot be made.**

For descriptive list and terms, address,

**UNION NUT CO., Sole Agents,**

**78 Beekman Street, New York.**

FULL SIZE OF KEY.

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# CONCORD TRADE MARK AXLES

Will Run Easier, carry a Larger Load, and Wear Longer than any other Axle in the Market.

**All GENUINE Concord Axles are stamped with above trade mark.** Manufactured only by

**D. ARTHUR BROWN & CO., Fisherville, Concord, N. H.**

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BUTCHERS' KNIVES,

BUTCHERS' STEELS,

AND

SHOE KNIVES.

CORPORATE TRADE MARK. FOUR PEPPERCORNS AND A DIAMOND

THE TRADE MARK, IN ADDITION TO THE NAME, IS STAMPED UPON EVERY ARTICLE MANUFACTURED BY

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Granted A.D. 1766, by the Corporation of Cutlers of Sheffield, and protected by Act of Parliament.

Buyers are specially cautioned against imitations of the mark, and the substitution of counterfeits bearing the name, "Wilson," only.

Works:—SYCAMORE STREET, SHEFFIELD. ESTABLISHED in the Year 1750.

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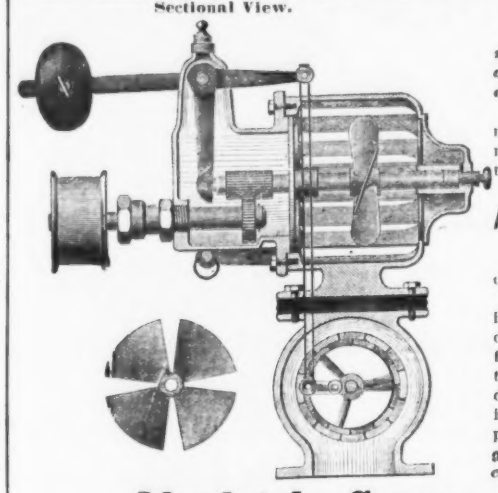
# HUNTOON GOVERNOR

**For Stationary and Marine Engines.**

WARRANTED

**The Most Perfect Steam Governor in the World.**

Sectional View.



Largely in use by the *U. S. Government at Treasury Department, State and Custom Houses, Navy Yards and U. S. Vessels.*

Also by leading manufacturing establishments, Rolling, Saw and Paper Mills, Tanneries, etc., throughout the country, where the most positive uniform speed is required.

The use of this Governor insures

**A positive saving in Steam of from 10 to 20 per cent.**

over any other Governor in use.

This Governor possesses no characteristics in common with others, either in principle or operation. We refrain, therefore, from entering into comparisons. The Centrifugal or Ball Principle is entirely abandoned in this invention, and the valve lever is sustained with the same velocity in one position as another. *No matter how great, violent or sudden may be the changes of load,* we warrant it to

**Absolutely Govern the Engine,**

which will run uninfluenced by the varying pressure of steam, be it thirty or eighty pounds.

In a moment's time the revolutions of the driving wheel can be changed to exactly the speed required without stopping any of the mechanism, remaing perfectly governed wherever set.

**These Governors are fully Warranted in every Particular.**

Address, for circulars of references, &c.,

## Huntoon Governor Co.,

**Lawrence, Mass.**

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# PHILADELPHIA FORGING WORKS.

MANUFACTURERS OF

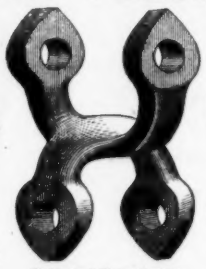
**"WROUGHT"**

**arriage Hardware,**

And all descriptions of

STEEL AND IRON

**DROP FORGINGS.**



Patented Feb. 16, 1875.

Also Sole Manufacturers and Patentees of the

**Patent Solid Norway Iron Platform Spring Shackles,**

Of all sizes, as low as Malleable Iron price.

**OFFICE and WORKS:**

1203, 1205 & 1207 E. Thompson Street, above Cumberland,

**PHILADELPHIA.**

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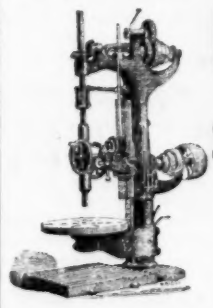


# Fitchburg Machine Co.

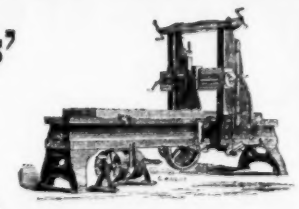
Manufacturers of

**Machinists' TOOLS.**

Office and Works,

**Sumner Street,**

**FITCHBURG, MASS.**



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# THE NEW "HOLDFAST" LATHE CHUCK,

**(Judson's Patent)**

Is rapidly becoming the most popular Independent Chuck now manufactured. The *New Principle* on which it is constructed remedies a serious defect existing in all ordinary Chucks.

Send for price list and circulars, with testimonials.

**DWIGHT ROBERTS, Manufacturer,**

210 Wythe Ave., Brooklyn, N. Y.

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# RICHARD DUDGEON,

**No. 24 Columbia Street, New York,**

MAKER AND PATENTEE OF

## Hydraulic Jacks and Punches,

**ROLLER TUBE EXPANDERS**

**And Direct-Acting Steam Hammers.**

*Communications by letter will receive prompt attention.*

**JACKS for Pressing on Car Wheels or CRANK PINS made to order**

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DIRECT - ACTING

# Steam Pumps,

Manufactured and for sale solely by

**STEELE & CONDICT,**

**TITAN IRON WORKS, Jersey City, N. J.**

Office and Salesroom

**88 Liberty Street, New York.**

No auxiliary valves used. Direct connection between piston rod and valve movement. No knocking or jarring. Circulars and price lists sent upon application.

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# CLARK TOMPKINS

Manufacturer and Patentee of

**UPRIGHT ROTARY**

## Knitting Machines,

Cone Winders for Hosiery Yarns,

NAPPERS FOR HOSIERY GOODS,

**Stop Motions & Alarms for Knitting Machines,**

**Flock Cutters, and Flock Renovators.**

**EXTRA PARTS FURNISHED PROMPTLY.**

☞ I am also prepared to furnish anything in the line of Gear Cutting from 5½ feet to ⅝ of an inch in diameter, any shape of tooth desired; Racks, Worms, Worm Wheels, Screws any size or number of threads to the inch, Wood Planing, Iron Planing, Large Lathe Work, Gear Cogging, Shafts, Haugings and Pulleys, also all kinds of Mill Work, Jobbing, and Machinery in general.

**Shop, Foot of Cypress St., Troy, N. Y.**

Particular attention paid to Experimental Machinery. We aim to maintain our reputation for doing work well.

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CROSSLEY'S Patent Lubricator GLOBE VALVES, &c.

Corner **Adams & John Sts., Brooklyn, N. Y.**

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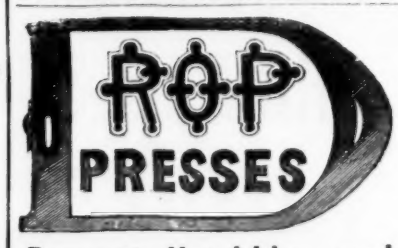


## Bennett Hotchkiss and N. C. Stiles' Patent.

This Drop (which has been illustrated in this journal as of that class in which the Hammer is raised by a stiff belt or board passing up between two friction rolls, and is so well known that we will only describe our improvements. The patents we are working under are those of Bennett Hotchkiss (who in an interference case with Goulding and Cheney was declared the first inventor) and N. C. Stiles. Our improvements consist:

*First.*—Of an arrangement of parts that makes it the most complete Jobbing Hammer, and will take the place to a great extent, of all other kinds for forging. In addition to the upright rod, which is operated by the hammer to open and close the rolls, we place another rod the lower end of which is secured to the end of a lever which is operated by the hand or foot, which operation also opens and closes the rolls at will. The lower end of this rod has a slot, so that the action of the hammer will not disturb the hand lever, thereby preventing the hand being injured, as otherwise would be the case.

*Second.*—No dog is used on the upright to hold up the hammer. The belt or board passes up between two clamps located under the rolls, so arranged that as the hammer rises they will freely open of themselves, but on descending they will close and hold up the hammer. To let the hammer fall the clamps are opened by pressure upon the foot treadle.

*Third.*—The board or belt is secured to the hammer by an elastic connection, which prevents the sudden jar and destruction of the same. The back roll is made adjustable to different thicknesses of board or belt, as also are the clamps. An adjustable collar on the upright rod allows the operator to obtain *any hight* of blow desired automatically. If one blow is wanted, press upon the treadle and remove the pressure as soon as the blow is given. Keep the foot upon the treadle and the blows will be repeated until the pressure is removed. If a blow of less hight than the collar is set for is required work the hand lever, which will give you any hight of blow desired. The hammer can be held up at any point below the collar by bringing the hand lever into action when the hammer is at the desired hight, so that the next blow can be given from a state of rest, of less hight than the collar is set for. This is a feature no other drop has; that is, the first blow struck can be of less hight than the second or third, and obtained from a state of rest. A gentle pressure upon the treadle will allow the hammer to go down slowly, but it will stop and remain suspended at any point as soon as the pressure is removed.

The clamps in holding up the hammer keep the boar from touching either roll and prevents the same fro being worn uneven.

**Manufactured only by the**

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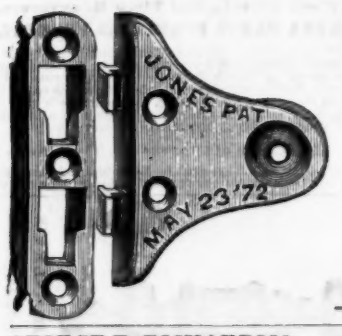
**Cast Butt Hinges,**
AND
**Miscellaneous Hardware.**

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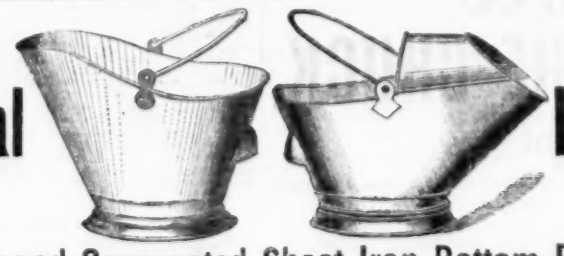
*J. CLARK WILSON & CO., New York Agents, 81 Beekman Street.*

**Coal**  **Hods.**

Stamped Corrugated Sheet Iron Bottom Riveted.

We manufacture six styles having our patent corrugated bottom, and all having the body bottom and hoop **riveted** together. Dealers before buying will find it to their advantage to get our prices, and also to beware of a **seamed** hod that is in the market, somewhat similar in shape to ours. Don't buy any but the **Corrugated Riveted Bottom Hod**, manufactured by

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PRY PANS, FIRE SHOVELS, ASH SIFTERS, &c. Send for Catalogue.

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Of Uniform temper and Warranted.
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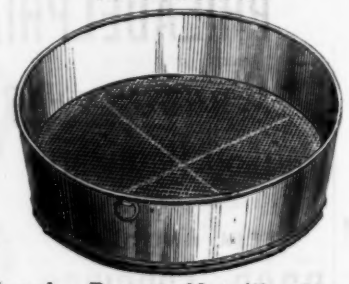

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The best sieve in use. To be had of all dealers.
A full assortment of these goods kept in stock at 88 Chambers Street., N. Y.
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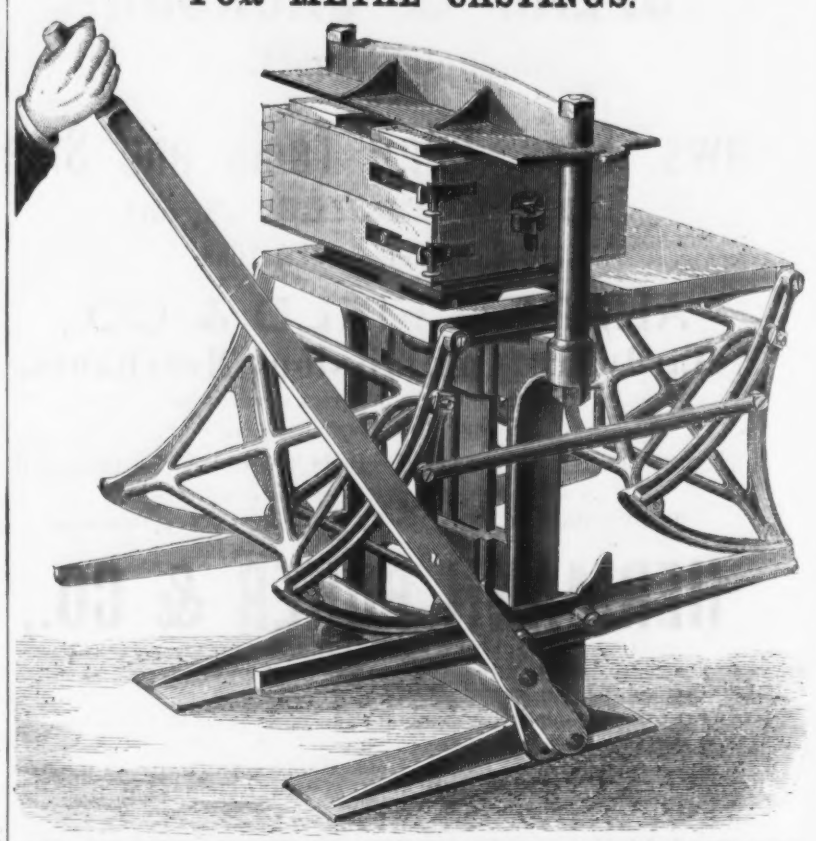
**Eames' Pat. Molding Machine**
FOR METAL CASTINGS.



The above machines have recently been introduced in several large iron foundries in this country, where they have given entire satisfaction. Among the advantages are:
1st. A great saving in the cost of producing castings.
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3d. The castings produced will be found more perfect, less poor work, and more uniform than if molded by the old method.
The machine is adapted for either Iron or Brass Castings. For further particulars, send for Circular. Address,

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Also Manufacturers of *Architectural Bronze Work, Locks, Hinges and fine Builders' Hardware generally.*
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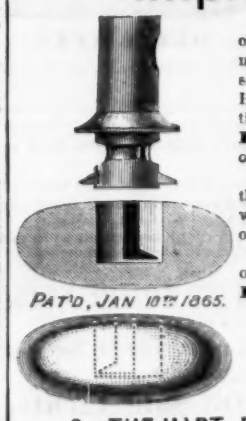


On the 10th January, 1865, we obtained Letters Patent for improved method of securing necks to Mineral and Porcelain Door Knobs, which improvement was used by us long enough to prove its utility, but on account of unsettled claim of joint ownership by former partner, its use was discontinued. Having now made a further improvement, for which we have made application for a Patent, we are now making the **BEST SECURED** and **MOST DURABLE** Mineral and Porcelain Door Knobs ever offered in this or other markets.
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See *The Iron Age*, of August 21st., page 11, for illustrated description of our patent **Telescope Locks and Latches**, with patent Flat Steel **Perforated Keys.**
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**BELLOWS.**
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Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

**Anvils.**—Solid Cast Steel.....₱ ℔ 14c
Peter Wright's, (Advanced April 1st.)₱ ℔, gold, 11½c
Wilkinson's..... " 11c
Eagle.....list 11 cents—dis 20 @ 20&10 %
**Apple Parers.**—Union.....per doz $7 50
Skeleton..... " 7 50
Victor..... " 7 75
Domestic..... " 7 75
Reading..... " 7 75
Bay State Paring, Coring and Slicing..... " 12 00
" " Peach Parers..... " 10 50
**Axes.**—Mann's Light.....Per doz. $12 00 @ 11 50
Hunt's Light..... " 14 00 @ 12 50
Red Indian, all sizes..... " 12 00 @ 11 50
Red Chiertain, all sizes..... " 12 50 @ 12 00
Crown Prince..... " 12 50 @ 12 00
**Augers and Auger Bits.**—Pierce's Pat.
Twist Bits.....dis 30 %
Douglass' & Ives' Bits.....dis 40&10 %
Connecticut Valley Auger Bits.....dis 40&10 %
Cook's Bits.....dis 40 10&10 %
Jennings' Bits.....dis 10 %
Bates' Nut Augers.....dis 40&10 %
Douglass' & Ives' Augers.....dis 40&10 %
Watrous' Ship Augers.....dis 10&15 %
Bonney's Pat. Hollow Augers.....dis 25 %
Stearns' Patent Hollow Augers.....dis 25 %
**Balances.**—
Landers, Frary & Clark's..... } Sold on Morton's new
Morton's..... } List.....dis 50 %
Chattillon's..... }
Common Spring with Hook..... ₱ doz $1 38 @ 2 00
**Bells.**—Bevin Bros. Mfg Co. Light Hand Bells.....dis 70 %
Common (Tissue Paper Weight).....dis 70&10 %
Swiss Pattern Hand Bells.....dis 50 %
Connell's Door Bells.....dis 50&5 @ 50&10 %
Gt. Western & Kentucky Cow.. dis 50&10 @ 50 10&5 %
**Boring Machines.**—Bates' Mfg. Co., complete with augers.....dis 20 @ 25 %
Douglas Mfg. Co., complete with augers..dis 20 @ 25 %
Common Boring Machines, no Augers....$4 00 @ 3 75
Angular " " ..... 5 00 @ 4 75
**Bolts.**—Eastern Carriage Bolts .....special prices
Western " " .....
Philadelphia " .....dis 60 %
" Eagle, (Coleman's).....dis 60 %
Wrought Shutter, Stanley.....dis 50 @ 50&10 %
**Braces.**—Barber's.....dis 40&5 %
Backus.....dis50 %
Bartholomew's American Ball.. dis 10&10 @ 15&10 %
Spofford.....dis 50 %
**Butts.**—Cast Fast Joint, Narrow... dis 25&10 @ 30&10 %
" " Broad.....dis 35&10 @ 40&10 %
Cast Fast Loose Joint.....dis 45&10 @ 50&10 %
" Acorn, Loose Pin.....dis 4 &10 @ 45&10 %
" Mayers & Parliament.....dis 35&10 @ 40&10 %
" Acorn Jap'd.....dis 40&10 @ 45&10 %
Wrought Loose Pin.....dis 35&10 %
" Table Hinges and Back Flaps.....dis 40&10 %
" Narrow.....dis 30&10 %
" Loose Joint.....dis 35&10 %
Parker's Blind Butts.... } Discount 50&10 % by the case
Sheperd's " .... } 60 %
Garretson's " .... }
Clark's " .... }
Lull & Porter's " .... }
Garretson's Blind Butts Light No. 0.... } Discount 60 %
" Lull & Porter Pattern } By the case
Cherrytree Blind Butts ..... } 60&10 %
**Chains.**—German Halter.....dis 30 %
" Coil.....dis 30 %
Galvanized Pump..... net 13 @ 13½c
Best Proof Coil Chain—

| ₱ ℔.. | 14 | 10½ | 9½ | 9 | 8¾ | 8½ | 8c gold |
|---|---|---|---|---|---|---|---|
| | 5-16 | ¼ | 5-16 | ⅜ | 7-16 | ½ | ⅝ in. |

By the cask, 560 lbs., ½c per lb. less Common Chain. ½c per lb. less.
**Chisels.**—Socket Framing.....dis 60 @ 60&10 %
Socket Firmer.....dis 60 @ 60&10 %
Tang " .....dis 40&10 @ 50 %
Beaty's Framing and Firmer.....dis 2 %
**Castors.**—Iron Bed.....dis 30&10 @ 40 %
Porcelain Wheel Bed.....dis 30&10 @ 40 %
Iron and Brass Wheel Plate.....dis 40 @ 40&10 %
Porcelain Wheel " .....dis 50 @ 50&10 %
**Clothes Wringers.**—Universal.....per doz $64 00
Novelty..... " 64 00
Discount on 2 dozen lots, $2 per dozen.
**Coffee Mills.**—Common Box and Side.....dis 15 %
Patent Box and Side.....dis 15 %
**Cutlery.**—American Pocket (best).....dis 25 %
Landers, Frary & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices
**Drawing Knives.**—Hart Mfg. Co.'s.....dis 60 %
Adjustable Handle.....dis 10 @ 15 %
Beatty.....dis 15 @ 20 %
**Fry Pans.**
Tinned.....dis 40 @ 45 %

| ₱ doz.. | $3 50 | 4 00 | 4 50 | 5 00 | 5 50 | 6 50 | 7 50 | 9 00 | 10 00 |
|---|---|---|---|---|---|---|---|---|---|
| No.... | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

Burnished.....dis 0 @ 45 %

| ₱ doz.. | $3 00 | 3 25 | 4 25 | 4 75 | 5 50 | 6 00 | 7 00 | 8 00 | 9 00 |
|---|---|---|---|---|---|---|---|---|---|
| No.... | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

**Files.**
Nicholson Mill Files.....new list
" Bastard..... "
" Taper..... "
Butcher's Mill (Advanced March 8th)... $5 25 to £ gold
" Bastard..... 5 25 to £ gold
" Taper..... 5 25 to £ gold
**Fluting Machines.**
K. F. M.—4½ in. rolls, $5 50.....dis 15 %
" —6 in. rolls, $6 50.....dis 15 %
Mrs Knox—4 in. rolls, $5 75.....dis 20 %
" —6 in. rolls, 7 00.....dis 20 %
**Hammers.**
Yerkes & Plumb's.....dis 15 %
Hammond & Son's.....dis 15 %
Verce.....dis 20 %
**Hatchets.**
Beatty's.....dis 15 @ 20 %

| Shingling and Half. { ₱ doz... | $7 00 | 7 50 | 7 75 | 8 00 |
|---|---|---|---|---|
| { No..... | 1 | 2 | 3 | |

Yerkes & Plumb.....dis 15 %

| Shingling and Half. { ₱ doz... | $7 00 | 7 50 | 8 00 | 8 50 |
|---|---|---|---|---|
| { No..... | 1 | 2 | 3 | 4 |

**Claw**.....{ ₱ doz..... $7 50 8 00
{ No..... 1 2 3
**Hinges.**
Strap and T, (Changed March 24).....dis 45 %

| **Horse Nails.** Nos. | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|
| Ausable | 27 | 26 | 24 | 23 | 22 |
| Globe | 28 | 26 | 25 | 24 | 23 |
| Brundage | 26 | 24 | 23 | 22 | 21 |
| Nos. | 5 | 6 | 7 | 8 | 9 10 |
| Putnam | 32 | 26 | 26 | 25 | 24 23 |

On Ausable, Globe and Brundage 1000 ℔ lots.....dis 5 %
**Knobs.**—Door, Mortise and Rim.
Makes in Combination.....new list dis 45&5 %
Extra discount for cash 2 %
Mineral and Rim.....dis 5 %
**Locks and Latches.**—Rim and Mortise.....dis 45&5 %
Extra discount for cash 2 %
Till and Cupboard.....dis 25 %
American Padlocks.....dis 50 %
Scandinavian Pad Locks.

| ₱ doz..... | $10 50 | 10 50 | 12 00 | 12 00 | 15 00 | 15 00 | } dis 15 % |
|---|---|---|---|---|---|---|---|
| No..... | 9 | 9½ | 10 | 10½ | 11 | 11½ | |
| ₱ doz..... | $13 00 | 15 00 | 22 00 | 22 00 | } dis 15 % | | |
| No..... | 12 | 12½ | 13 | 13½ | | | |

Trunk Locks.....dis 5 @ 10 %
Thumb and Roggens Latches.....dis 25 %
**Lanterns.**—Square Candle and Oil.....dis 10 %
Globe for Oil.....dis 10 %
" " Kerosene.....dis 10 %
Tubular Lanterns.....dis 10 %
**Mattocks.**—Long and Short Cutter.....dis 25 %
Western Pattern.....dis 25 %
Pennsylvania Pattern.....dis 15 %
**Molasses Gates.**
Enterprise Mfg. Co.'s Measuring Faucets.....dis 20 %
Stebbins' Gates.....dis 60&10 @ 65&10 %
Lincoln's " .....dis 40&10 @ 50 %
Landers, Frary & Clark's Petroleum.....dis 15&10 %
Taylor's Petroleum Faucets.....dis 20&10 %
Brass Liquor Cocks.....dis 20&10 %
**Meat Cutters.**—Dixon's.....dis 15 %
Woodruff.....dis 15 %
Stowe.....dis 15 %
Hale's.....dis 25 %
Stuffers.....dis 10 %
**Planes.**—Auburn Tool Co., "Bench".....dis 40 %
Second Quality.....dis 50 %
Metallic Plane Co.....dis 25&5 %
Evans Pat. Circular.....net
**Plumbs and Levels.**
Adjustable.....dis 60&10 %
Non-Adjustable.....dis 60, 10&10 %
**Plane Irons.**—American.....list net
Butcher's.....gold £, $5 50
**Picks.**—Philadelphia.....net
Pittsburgh.....net
**Rules**.....dis 60, 10&10 @ 70 %
**Rakes.**—Cast Steel Garden.....dis 40 @ 40&5 %
Malleable Garden.....dis 40 @ 40&5 %
Wood Head Iron Teeth.....dis 40 %
**Steelyards.**—American Pattern.....dis 15 %

| ₱ doz..... | $5 50 | 7 00 | 9 00 | 10 00 | 11 00 | 12 00 |
|---|---|---|---|---|---|---|
| No..... | 50 | 100 | 150 | 200 | 250 | 300 |

English Pattern.....dis 15 %

| ₱ doz..... | $7 00 | 8 67 | 10 67 | 12 67 | 14 67 | 16 67 |
|---|---|---|---|---|---|---|
| No..... | 50 | 100 | 150 | 200 | 250 | 300 |

L. F. & C. Excelsior.....dis 10 %

| ₱ doz..... | $9 00 | 10 00 | 12 00 | 15 00 | 18 00 | 21 00 |
|---|---|---|---|---|---|---|
| No..... | 50 | 100 | 150 | 200 | 250 | 300 |

**Scythes.**—Golden Clipper, Damascus Blade. Boxed and Sharpened.....₱ doz. $10 00 net
Golden Clipper No. 10. Boxed and Sharpened.....₱ doz $9 75 net
Green Clipper No. 5, Boxed and Sharpened.....₱ doz $9 50 net
Common Scythes.....₱ doz $7 50 @ 9 00
**Squares.**—Steel and Iron, new list.....dis 50 %
**Saws.**—Disston's Cross Cut.....dis 15 %
Disston's Hand.....dis 12½ %
W. McNiece's H'd, Cross-Cut & Circ'r, new list. dis 15 %
Boynton's Lightning, new list.....dis 40 %
" Champion.....dis 45 %
**Shovels and Spades.**
Rowland's Plain Back, Jan. 23d.....dis 25 %
" Back Strap " .....dis 25 %
Oliver Ames & Sons.....new list dis 12½ %
Brady Shovel Co.....dis 12½&5 %
**Sad Irons.**—Richmond (polished face).....per lb. 8½c
Richmond (polished face)..... ....by the cask " 8½c
**Stone.**—Arkansas Oil, No. 1..... ₱ ℔ $1 75
Turkey Oil, No. 1..... " 1 00
Washita Extra..... " 30c
" No. 1..... " 22c
" " 2..... " 18c
Screws.—Iron.....new list, April 1st, 1875, dis 62½ %
Brass.....dis 52½ %
**Spoons.**—
Plated.....dis 40&10 @ 50 %
Britannia, Boardmans (new list).....dis 50&10 %
" Parkers (old list) .....dis 50 %
German Silver.....dis 30 %
" Light.....new list dis 35 %
Laiance & Grosican Iron.....dis 40 %
**Springs.**—Gray's Door.....dis 50 @ 50&10 %
Torry's Door.....dis 50 @ 50&10 %
**Stocks and Dies.**.....dis 10&5 %
**Stove Polish.**—Gem.....₱ gross, $5 00
Onyx..... " $5 00
**Try Squares.**—Winterbottom.....dis 10 @ 15 %
Stanley Rule and Level Co.....dis 45&10 %
Willis Thrall, No. 2.....dis 30&10 %
Disston's No. 2.....dis 40 %
**Tacks, &c.**—Half Weight Tacks.....dis 72½ %
" " by the case...dis 72½&7½ %
Clout and Finishing Nails.....7½ %
" " by the case.....dis 7½ %
**Traps.**—Genuine Oneida—Newhouse list.....dis 20 %
Imitation " " .....dis 30 %
**Vises.**—Solid Box, currency..... ₱ ℔ net 14c
**Wrenches.**—Coes Genuine.....dis 40 @ 40&5 %
Coes Imitation Wrought Bar.....dis 50&50&10 %
" " Malleable Bar.....dis 60&10 %
" " (Kellogg) Malleable Bar.....dis 65&10 %
Tafts Pattern (Wrought Bar).....dis 70 @ 70&10 %
Philadelphia Tool Co.'s Pat. Dupiex.....dis 25 %
" " " Improved Baxter.....dis 25%
" " " Adjustable Fork.....dis 25 %
**Wire.**—No. 0 to 18.....(Advanced April 24th)....dis 40 %
No. 19 to 26..... " " ..dis 47½ %
No. 27 to 30..... " " ..dis 52½ %
Coppered 0 to 12..... " " ..dis 52½ %
Tinned Broom Wire.....dis 15 @ 20 %
Galvanized Wire No. 1 to 18.....dis 25 %
" " 19 to 24.....dis 40 %

## BUFFALO.

*Reported by Messrs. Sidney Shepard & Co.*

March 1, 1875.

Augers—Snell Mfg. Co.....dis 25 %
Bits, Auger—Snell Mfg. Co.....dis 25 %
Bells, Cow—Law's Genuine.....dis 20 %
Bolts—Carriage and Tire.....dis 75, 10&5 %
Braces—Bit, Spofford's Patent.....dis 30 @ 35 %
Brads, Cut.....dis 50&10 %
Boards—Stove, Brooks' Patent.....dis 50 @ 7½ %
Butts—Brass.....dis 50 %
Wrought Narrow.....dis 30 %
" Broad, Loose Joint.....dis 30&10 %
" Table and Back Flaps.....dis 35&10 %
Wrought Butts, Loose Pin.....dis 30&10 %
Belting—Rubber.....dis 30&10 %
Leather, new list, oak tanned.....dis 30 @ 35 %
Brick—Bath (box of 2 doz) Best English.....dis 20 %
" Rutherford " .....$1 25
Cases—Parlor Coal Hod.....$1 00
Chalk—White, Carpenter's .....dis 10 %
Red, Carpenter's .....₱ gross, 50c
Blue, " .....50c
Chisels—Firmer Socket.....$1 00
Framing Socket.....dis 60&10 %
Corner Socket Chisels.....dis 60&10 %
Slick's Carpenters'.....dis 60&10 %
Castings—Malleable.....dis 60&10 %
Elbows—Corrugated.....₱ ℔ 10c

| | 5 | 5½ | 6 | 7 | |
|---|---|---|---|---|---|
| Charcoal | $3 50 | 4 50 | 5 25 | 6 50 | } dis 10 % |
| Russia | 7 00 | 9 50 | 12 00 | 14 00 | |

Files—Malschoss Bros.....dis 50 %
Fluters—Geneva Hand.....dis 50 %
Freezers Ice Cream—"Champion".....₱ doz. $15 00
Hammers—Henry W. Kip's.....dis 30 %
Hinges—Window Blind—.....dis 7½ %
Clark's.....dis 55&10 %
Sheperd's and Standard.....dis 55&10 %
Wrought Strap and T.....dis 30&10 %
Hods, Coal—Plain, Black and Galvanized.....dis 45 %
Funnel, Black and Galvanized.....dis 10 %
Fancy and Helmet.....dis 10 %
Hooks and Staples—Wrought.....dis 10 %
Hooks—Belt.....dis 70&10 %
Hasps and Staples—Wrought.....dis 50&10 %
Sad Irons.....dis 70&10 %
Kettles—Brass.....3½c
Enameled.....₱ ℔. 45c
Knives, Drawing—Oval No. 1.....dis 50&5 %
Razor Blade.....dis 60&10 %
Lanterns "Peerless."....No. 1 3 5 10
₱ doz $25 00 $10 50 $13 75 dis 10 %
Tubular.....dis 10 %
" with Guards.....
Machines—Apple Paring, "Turn Table".....$100 ₱ doz
Mills, Coffee—Box and Slide, common.....dis 15 %
Box Union and Eagle.....dis 15 %
" American.....dis 15 %
Nails—Clout and Finishing.....dis 20 %
Shoe.....dis 7½ %
Horse, Ausable.....No. 5 6 7 8 9 10
30 27 25 24 23 22c
" " Pointed & Polished.....add 1c ₱ ℔
" " 1000 lbs.....
" Clinton.....No. 6 7 8 9 10
21 19 18 17 16c
Packing—Rubber.....dis 5 %
Case lots.....dis 30 @ 35 %
Paint—White Lead, U. S. Gov't.....₱ ℔ 8½c
Rivets—Iron, Black and Tinned.....dis 25&7½ %
Rope—Manila, ½ inch and larger.....₱ ℔ 14½c
Sisal, ½ inch and larger.....11½c
Jute, all sizes.....9½c
Screws—"American Screw Co"—
Flat Head, Iron.....dis 52½ %
Flat Head, Brass.....dis 52½ %
Spoons, Iron Tinned.....dis 10 %
" by the case.....dis 20 %
Plated Rogers' A No. 1.....dis 20 %
Britannia.....dis 5 %
Squares—Steel and Iron.....dis 45&10 %
Scales—Buffalo Scale Works.....new list 50 %
Fairbanks.....dis 25 %
Stove Polish—Gem.....dis 15 %
" Dixon's.....₱ gross, $4 50
Traps, Steel—Newhouse.....6 00
Tacks—Half Weight Am. Iron.....dis 72½&7½ %
Vises—Parallel, Buffalo.....dis 10 %
Wire—French, Tinned and Iron.....dis 25 %
Stamped and Japanned.....dis 25 %
Cast Iron Hollow.....dis 5 %
**Tin Plates.**—Add for each X.....dis 40 %

| 10x14, IC. Charcoal | $12 00 | 14x20 C. terne | $11 00 |
|---|---|---|---|
| 12x12, " | 12 50 | 20x28 C. " | 22 75 |
| 12½x17, " | 11 50 | 20x28 X. " | 27 25 |
| 14x20, " | 13 00 | | |

**Pig Tin**—Straits.....26c @ 29c
Bar Tin.....30c
**Solder**.....No. 1, 16½c ; No. 2, 15½c
**Sheet Zinc**—
"Lasalle".....$10 ₱ 100 ℔ casks
Sheets.....$11 75 11 05 ₱ 100 ℔s
**Iron Wire**—Bright and Annealed.....dis 45 %
Coppered.....dis 40 %
Tinned.....dis 20 %

| Tinned Broom, { Nos. | 20 | 21 | 22 | } dis 25 % |
|---|---|---|---|---|
| { | 20c | 21c | 21c | |

**Copper**—Sheathing 14 @ 16 oz.....₱ ℔ 31c
Planished.....₱ ℔ 36c @ 38c
Bottoms.....₱ ℔ 32c
Bolts.....₱ ℔ 33c
Braziers' Sheets.....₱ ℔ 33c
**Sheet Iron.**—
18 Common.....$4 30
24 Common.....4 50
24 W. D. Wood & Co., Smooth Finish.....5 20
Am. Russia.....A. B.
19c 11c
Gen. Russia, No. 1 stained.....18c
" " clean.....19c
Galvanized.....dis 30 %

## CINCINNATI.

*Reported by Sellew & Co., Importers and Jobbers of Metals, No. 214, 216 and 218 Main street.*

**Tin Plate.**—I. C. 10x14 Charcoal.....$11 50 @ 12 00
I. X. 10x14 Charcoal.....14 00 @ 15 00
I. C. Terne 14x20.....10 50 @ 12 75
I. C. Terne 20x28.....21 00 @ 23 00
I. C. Continuous.....24 00
**Block Tin.**—
Pig.....₱ ℔ 27c @ 29c
Bars.....₱ ℔ 31c
**Solder.**—
S. & Co.....₱ ℔ 22c
A 1.....₱ ℔ 19c
Roofing.....₱ ℔ 17c
**Lead.**—Pig.....₱ ℔ 7½c.
Bar.....₱ ℔ 8½c
**Copper.**—
Ingot.....₱ ℔ @ 24c
Planished.....@ 59c
Sheathing.....@ 33c
Sheets, 8 to 9 lb.....@ 38c
" 10 to 12 o.....@ 35c
Braziers, 18 lb.....@ 32c
Copper Bottoms.....@ 34c
**Zinc.** Cask, 800 to 1000 lbs.....₱ ℔ 10½c
Case, 100 lbs.....11 c
Slab.....7½c
**Brass.**—Roll, No. 28 to 30.....₱ ℔ 30c
Roll, No. 30 to 38.....35c
Roll, No. 38 to 40.....50c
Wire, No. 0 to 20.....35c
" 20 to 25.....40c
**Babbit Metal.**—Sellew & Co.....35c
Allens'.....20c
Market.....12c
**Antimony**.....₱ ℔ 17c.
**Bismuth**.....₱ ℔ $4 00
**Nickel**.....₱ ℔ $3 50
**Sheet Iron.**—Gen. Russia.....₱ ℔ 20c
Planished A.....₱ ℔ 15c
" B.....12½c

| | Com. B. | Smooth Fin. S. L. U. | Smooth D Re'fd. |
|---|---|---|---|
| 15 to 20 | 4½c | 5½c | 7½c |
| 22 to 24 | 4½c | 5½c | 7½c |
| 26 | 4½c | 5½c | 7½c |
| 27 | 5½c | 6½c | 8½c |

**Galvanized Iron.**—Full bundles.....dis 20 %

| Nos. 18 to 20 | 12c | No. 26 | 14c |
|---|---|---|---|
| 22 to 24 | 13c | 27 | 15c |

**Bar Steel.**—Silver, ₱ ℔ 16c ; Crescent, 21c.
**Iron Wire**.....dis 35 %
**Enameled Ware**.....dis 45 @ 50 %
**One Piece Corrugated Elbows**.....dis 10 %

| Charcoal Iron. | | Russia Iron. | |
|---|---|---|---|
| 4½ inch..... | ₱ doz $2 50 | 4½ inch..... | ₱ doz $5 00 |
| 5 " ..... | " 3 50 | 5 " ..... | " 7 00 |
| 5½ " ..... | " 4 50 | 5½ " ..... | " 9 50 |
| 6 " ..... | " 5 25 | 6 " ..... | " 12 00 |
| 7 " ..... | " 6 50 | 7 " ..... | " 14 00 |

**Leader Elbows, Flat Crimp Retinned or Galvanized.**—Dis. 10 %

| | ₱ doz. | | ₱ doz |
|---|---|---|---|
| 2-inch | $1 75 | 2½-inch | $2 75 |
| 3-inch | 2 25 | 3½-inch | 3 25 |
| 4-inch | 2 50 | 4½-inch | 3 50 |

**Sheet Iron Bread Pans**.....₱ ℔ 10c
**American Broilers**.....₱ doz. $13 50
**Tinmen's Machines**.....dis 5 %
**Sad Irons**.....₱ ℔. 3½c
**Brass Kettles.**—Ansonia.....45c
**Dog Irons**.....3½c

## PITTSBURGH.

The following are the Card rates of Lewis, Oliver & Phillips, H. B. Newhall, 11 Warren St., New York, Agent. Iron, standard list assorted sizes, for large orders, c, card rate, 2 % off net.
Flat Rail (1½x¼), punched and coun'sunk..4·4c ₱ ℔ net
Iron Wedges.....4½c ₱ ℔ net
Norway Nail Rods.....9¼c ₱ ℔ net
Crow Bars (in ordering please state whether "Wedge" or "Pinch" point).....5c ₱ ℔ net
Beetle Rings.....8¾c ₱ ℔ net
Fence Pickets—
⅝ round, bent to shape, 80c ₱ ft. of fence, less 15 % off net.
Discount off Standard List.
Carriage and Tire Bolts (new list).....70&10 % off net
Plow Bolts.....30, 10&5 % off net
Stove Bolts.....15 % off net
Machine and Square Head Bolts.....30&10 % off net
Coach and Lag Screws.....30&10 % off net
Bolt Ends.....35 % off net
Pat. Hot Pressed Square and Hexagon Nuts, small sizes, from 3-16 to ⅜ in.....7½c ₱ ℔ off net
Pat. Hot Pressed Square and Hexagon Nuts, large sizes, from 7-16 to 2 in.....6 c ₱ ℔ off net
Washers, all made from new band iron, small sizes, from 3-16 to ⅜ in.....9 c ₱ ℔ off net
Washers, all made from new band iron, large sizes, from 7-16 to 1⅛ in.....7 c ₱ ℔ off net
Nuts and Washers in 25 lb. boxes, 1c ₱ ℔ ex. Nuts and Washers in lots less than one keg each size, 1c ₱ ℔ ex. Nuts and Washers in 5 lb. boxes, 1½c. ₱ ℔ ex.
Harrow Teeth, in lots of 1 ton or more, packed in casks, 1 in. diam. 3¾c ₱ ℔ net ; ⅞ & ¾ in. diam. 3¾c ₱ ℔ net ; ⅝ in. diam. 4c ₱ ℔ net.
Patent Headed Harrow Teeth, packed in casks, ½c ₱ ℔ ex
Skein Bolts, in bulk, in lots of 1 keg or more, ⅝ in. diam. 5¼c ₱ ℔ net ; 9-16 in. diam. 6½c ₱ ℔ net ; ½ in. diam. 7½c ₱ ℔ net. 1c ₱ ℔ extra when less than 1 keg of each size is ordered.
Screw Hook-and-Eye Hinges, ¾ to 1 in. diam. 9c ₱ ℔ net; ⅝ in. diam. 10c ₱ ℔ net; ½ in. diam. 12 c ₱ ℔ net.
Screw and Strap Hinges, in lots of 100 pairs or more, 14 to 16 in. long, 5¼c ₱ ℔ net ; 8, 10 & 12 in. long, 6¾c ₱ ℔ net
Strap and T Hinges.....30 & 10 % off net, delivery as customary.
For purchases amounting to $250 between May 30th and December 31st, 5 % extra off.
Screw Hitching Rings.....$5 25 ₱ 100 net
Duck Nest Tuyere Irons.....$14 50 ₱ doz net
Cast Iron Washers.....₱ ℔ 4c net
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long.....₱ ℔ 4 c net
1 to 2 in. diam. from 4 to 8 ft. long.....4½c net
1 to 2 in. diam. from 1½ to 4 ft. long.....4½c net
⅝, ¾ and ⅞ in. diam. over 4 ft. long.....4½c net
⅝, ¾ and ⅞ in. diam. from 1½ to 4 ft. long.....5½c net
Bridge bolts with upset ends.....½c. ₱ ℔ extra
Wrought iron plates, punched.....5c. ₱ ℔ net

WAGON HARDWARE.

Wagon Box Strap Bolts—
10 in. long by 7-16 at Screw End, ₱ set of 8 bolts.. 55c
12 " ½ " " 8 " 70c
10 " 9-16 " " 8 " } 90c
12 " 9-16 " " 8 "
14 " 9-16 " " 8 " } $1 00
10 " ⅝ " " 8 "
12 " ⅝ " " 8 " } 1 00
14 " ⅝ " " 8 "
16 " ⅝ " " 8 " } 1 10
5c ₱ set for each additional inch over 14 in. All lengths made.
In ordering Box Strap Bolts please give diameter at Screw End.
Wagon Box Rods, narrow track, each.....18c
" " wide track, each.....20c
Single Tree Irons, ₱ set of four pieces.....38c
Wrought Iron Bolster Plates, 2¾ in. wide, ₱ set.....60c
" " 3 " " .....65c
" " 3½ " " .....70c
" " 3½ " " .....75c
Wagon Brake Ratchets, each.....16½c
" " finished with guard, each..45 c
Wrought Hammer Straps, heavy pattern, each.....16 c
" " light " each.....13½c
" Rub Irons, each.....11 c
Stay Chain Hooks, each.....8 c
Double and Single Tree Clips, figure 1, each.....9 c
" " " 2, each.....10 c
" " " 3, each.....12 c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks and Clips, in lots of 50 sets.....dis 25 %
Wagon Box Staples, 1¾ to 2¼ in. to clinch..₱ 1000 $11 00 net
" " " Bevel Box Iron, to rivet on. ₱ 1000 7 50 net
Neck Yoke Eyes, each.....4½c net
" " with ⅝ rings, each.....7½c net
King Bolts, ⅝, 1, 1¼, and 1¼ in. diam.....₱ ℔ 4½c net
Wagon Rivets, ex. large, flat, oval and steeple head, ¼ in. diam. all lengths.....8½c net
Wagon Rivets, 3-16 in. diam., all lengths.....9½c net
" & Nails, in 5 ℔ paper boxes....₱ ℔ 1c extra
" in 25 ℔ wood " ½c extra
Wagon and Hinge Nails, ¼ in.....₱ ℔ 13 c net
" " " 3-16 in.....10 c net
Double Tree Plates.....8½c net
Coupling " .....9 c net
Tongue " .....5½c net
Neck Yoke Plates.....11 c net
Tongue Cap Iron, 1¾, 2 & 2¼ in. wide, same price ₱ ℔ as Band Iron.
Wagon Chains, Stay Lock and Tongue, 5-16 in. ₱ ℔ 10½c net. ¼ in., 11½c. net

## DETROIT.

*(Reported by Messrs. Jewett & Root.)*

**Tin Plate.**—Best Charcoal
IC, 10x14.....$12 00
IX, 10x14.....14 75
XX, 10x14.....17 50
IC, 12x12.....12 50
IX, 12x12.....15 25
IC, 14x20.....13 00
IX, 14x20.....15 75
XX, 14x20.....18 50
XXX, 14x20.....21 25
XXXX, 14x20.....24 00
Dc, 100 Plate.....11 50
DX " .....14 25
DXX " .....17 00
DXXX " .....19 75
DXXXX 100 Plate..22 50
IX, 14x14.....24 00
IC, 10x14 W.....11 50
IX, 10x14 W.....14 25
**Roofing Tin.**—Best Char.
IC, Terne, 14x20.....$11 00
IX, " 14x20.....13 75
IC, Terne, 20x28.....15 00
IX, " 20x28.....18 00
**Coke Tin.**—
IC, 10x14 Coke.....$10 25
IX, 10x14, Coke.....13 00
IC, 14x20, " .....11 25
**Pig Tin.**—
Large Pigs.....29c
Small Pigs.....29½c
Bars.....30c
**Solder.**—No. 1.....16c
No. 2.....15c
**Sheet Zinc.**—
In any quantity.....10¾c
**Bright Wire.**
63 lbs. in bdl.....dis 40 %
**Copper.**—
Sheathing.....31c
Copper Bottoms.....32c
**Planished Copper.**—
Sheathing, 14x48.....38c
Boiler Size, No. 7.....40c
" " No. 8.....40c
" " No. 9.....40c
**Sheet Iron.**—
No. 18 Am. Com.....4 40
No. 24 Am. Com.....4 60
No. 26 Am. Com.....4 80
Patent Planished Russia, Nos. 24, 25 and 26....14c
Genuine Russia, No. 9, 10, 11 and 12.....18c
Broken bdls. 3c. extra.
W. D. WOOD'S & CO.'S SHEET IRON.—
Nos. 15 to 20 Smooth $5 85
" 21 to 24..... 6 05
" 25 & 26..... 6 25
" 21 to 21 Char'l.. 7 55
" 25 & 26 " .. 7 75


Send 50 cents for 6 samples (Prepaid) of
**HAMMOND'S WINDOW SPRINGS.**
For supporting and locking upper and lower sashes of all windows. Not a coiled spring, but one *forged* from best materials.
W. S. HAMMOND,
Lewisberry, York Co., Pa.

Gold Medal at Md. Ins. Exposition, Oct. 1874.
Er dless-Lever House & Weight Mover.
Patented January 14, 1873.

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THE REAMY TRUCK CO. of Baltimore, Md.
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Will Prevent Show Windows from Sweating (by partly equalizing inside and outside air) and Supply Pure Air without Draft.

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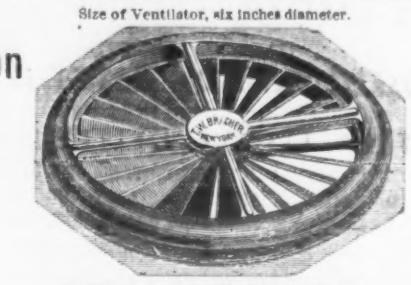
Size of Ventilator, six inches diameter.

Construction Entirely New.

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An Oil-Tempered Steel Spring that takes up Expansion of the Bolt, and keeps a perfect tight joint. Solid Steel Tamping and Clay Picks.

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**Hemp Piston Packing**
FOR
Locomotives, Steamships, Stationary Engines, Hot or Cold Water Pumps.

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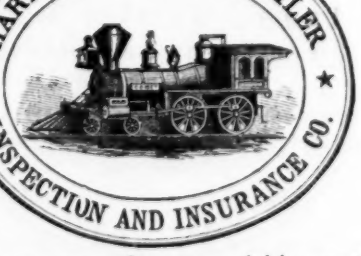

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ARISING FROM
**STEAM BOILER EXPLOSIONS.**
The Business of the Company includes all kinds of STEAM BOILERS
Full information concerning the plan of the Company's operations can be obtained at the
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## Steel.

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1st CLASS PRIZE MEDAL, CLASS 1st UNIVERSAL EXHIBITION OF INDUSTRY PARIS, 1855.

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CAST, [illegible], SHEET, AND BLISTER STEEL, OF EVERY DESCRIPTION.

BEST CAST STEEL WIRE, ADAPTED SPECIALLY FOR MECHANICAL PURPOSES; Also for ROPES, NEEDLES, FISH HOOKS, PINS, CRINOLINE, &c.

BEST CAST STEEL FILES, SAWS, EDGE TOOLS, HACKLES, GILLS, CARD CLOTHING, CARD TEETH, HACKLE AND GILL PINS, FISH HOOKS, NEEDLES. &c.

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MOSS & GAMBLE **SUPERIOR C. S. "FULL WEIGHT" FILES,**

Cast Steel Hammers and Sledges. Also, "M. & G." Anvils and Vises.

WARRANTED CAST STEEL, especially adapted for DIES and TURNING TOOLS, DRILLS, COLD CHISELS, PUNCHES and all kinds of MACHINISTS' TOOLS.

Celebrated Improved Mild Centre Cast Steel, for Taps, Reamers, and Milling Tools, warranted not to crack in hardening Taps of any size.

Swede Spring Steel, especially adapted to Locomotive and Railway Car Springs.

English Spring and Plow Plate Steel. Also, manufacturer of

Steel Cast Steel, Shear, German, Round Machinery, Hammer, Fork and Shovel Steel

*And GENERAL MERCHANT.*

**A. M. F. WATSON, General Agent.**

---

# WILSON HAWKSWORTH, ELLISON & CO.,

MANUFACTURERS OF

# STEEL, STEEL WIRE, &C.,

**AND GENERAL MERCHANTS,**

**CARLISLE WORKS, SHEFFIELD, ENGLAND.**

AGENCIES

New York, 72 John Street.

Philadelphia, 505 Commerce Street.

Boston, 21 Oliver Street.

New Orleans, La., 111 Gravier St.

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## Isaac Jenks & Sons,

**MINERVA AND BEAVER WORKS, WOLVERHAMPTON, ENGLAND.**

*MANUFACTURERS OF*

"JENKS" SPRING STEEL, "MINERVA" SWEDES, AND "ANGLO" CAST SPRING STEEL;

"JENKS" TIRE, TOE CORK, SLEIGH SHOE, BLISTER, AND PLOW STEEL;

ALSO,

"BEAVER" PLOW, TIRE, AXE, AND SHEET IRON.

VAN WART & McCOY, Agents, 134 & 136 Chambers Street, N. Y.

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# J. & RILEY CARR,

MANUFACTURERS OF SUPERIOR

# STEEL

For Tools, Cutlery, Saws, Files, Augers, Gimblets, &c.; Sheet Cast Steel for SPRINGS AND STAMPING COLD;

ALSO THE CELEBRATED

**DOG BRAND FILES,**

Unsurpassed, if equaled in quality.

Bailey Lane Works, Sheffield, England.

Warehouse, 82 John St., New York.

Established 1810.

HENRY MOORE, Attorney.

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## Steel.

# SANDERSON BROTHERS & COMPANY,

(LIMITED)

DARNALL WORKS, ATTERCLIFFE FORGE, } SHEFFIELD, ENGLAND.

Sole Manufacturers of the CELEBRATED

## CAST STEEL,

Warranted most SUPERIOR and UNSURPASSED for

**TOOLS and GRANITE ROCK DRILLS.**

A full assortment of this universally approved OLD BRAND of English Steel, and

ARMITAGE'S GENUINE MOUSEHOLE ANVILS,

For Sale by

**EDWARD FRITH, 16 Cliff Street, New York.**

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# FRANCIS HOBSON & SON,

**97 John Street, NEW YORK,**

Sole Manufact'rs of **"CHOICE"** Extra Cast Steel.

Manufacturers of all Descriptions of Steel.

Manufacturers of Every Kind of Steel Wire.

**Don Works, Sheffield, England.**

JOHN HOGAN, Agent.

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# S. & C. WARDLOW,

MANUFACTURERS OF THE CELEBRATED

**Cast and Double Shear**

## STEEL,

**In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table, Carving, Butcher and Shoe Knives, Turning Tools, Dies, Files, Clock or other Springs, Saws and Tools of every variety.**

**SHEFFIELD, ENGLAND.**

*Office of S. & C. WARDLOW, 95 John Street, New York.*

*In calling the attention of consumers of Steel in any of the varieties above enumerated, we would respectfully assure them of our ability to supply an article that cannot be excelled in quality, temper, and adaptation in all respects to the various purposes for which it may be required. Half a century of practical experience in all departments of Steel manufacture, a long established reputation in England, and the Continent of Europe, and in the Eastern States principally of this Country, encourage us to solicit a universal trial of our Steel for the above or other purposes for which a first class material in quality, temper, and durability is needed*

---

# G. SANDERSON & CO.,

Manufacturers of all descriptions of

## STEEL.

Bailey Street and Broad Lane Steel Works, } SHEFFIELD, ENGLAND.

Particular attention is paid to quality and temper for

**Files, Saws, Table and Pocket Cutlery, Augers, Shovels, &c.**

**ALSO STEEL** of superior quality for **Turning Tools, Taps, Dies, Drills,** &c.

**Hot and Cold Rolled Sheets for Clock Springs, Corset Clasps, Pens, &c.**

☞ *Makers of the Celebrated ROCK BORING DRILL STEEL.*

Warehouse, 57 John Street, New York.

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# BARROW HÆMATITE STEEL COMPANY,

LIMITED.

BARROW IN FURNESS, LANCASHIRE, ENGLAND.

MANUFACTURERS OF

## Steel Rails, Tyres, Wheels,

Axles, Shafting, Boiler & Ship Plates, Bessemer Pig Iron, etc., etc.

**CHAS. CONGREVE & SON,**

**Sole Agents for the United States,**

**104 & 106 John Street, opposite Cliff Street, NEW YORK.**

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# D. G. GAUTIER & CO.,

MANUFACTURERS OF

Hammered and Rolled STEEL of every description

JERSEY CITY, NEW JERSEY.

DUDLEY G. GAUTIER. JOSIAH H. GAUTIER

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# CHROME STEEL COMPANY,

MANUFACTURERS OF

## CHROME CAST STEEL,

WARRANTED SUPERIOR TO ANY STEEL IN THE MARKET—EITHER ENGLISH OR AMERICAN—FOR EVERY PURPOSE.

Principal Office & Works, Kent Ave. and Keep St., Brooklyn, E. D., N. Y.

AGENCIES,

Kimbark Bros. & Co., Chicago, Ills.
Huntington, Hopkins & Co., San Francisco and Sacramento, Cal.
M. M. Buck & Co., St. Louis, Mo.
Potter & Hoffman, Philadelphia, Pa.
Geo. Dunbar & Co., Boston, Mass.
Wood & Leggat, Hamilton, Ont.

WILLIAM TOOTHE, Genl. Sales Agent, 110 Liberty St., N. Y. City.

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## Steel.

# Sheffield Steel Works,

(Established in 1848.)

**SINGER, NIMICK & CO.**

Pittsburgh, Pa.,

Manufacturers of **Extra Quality Tool**

## CAST STEEL,

**Patent Rolled**

**SAW PLATES,**

All descriptions of **Cast and German**

**Spring and Plow Steel**

**Elliptic and Side Springs, Seat Springs.**

**AXLES, STEEL TIRE,**

**Plow Wings, Shares, Cultivators, Reaper Bars, ow Bars, &c., &c.**

**Warehouse,** 83 Water and 100 First Streets.

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**MILLER, BARR & PARKIN,**

# Crescent Steel Works,

**PITTSBURGH, PA.**

Manufacturers of all descrip[illegible] of

## STEEL

**EQUAL TO ANY IN THE MARKET.**

**Office.....339 Liberty St.**

**PITTSBURGH, PA.**

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## Gunpowder.

# GUNPOWDER

## DUPONT'S

Sporting, Shipping, and Mining

**POWDER.**

**DUPONT'S GUNPOWDER MILLS**

**ESTABLISHED IN 1801,**

Have maintained their great reputation years. Manufacture the

Celebrated Eagle Ducking, Eagle Rifle, and Diamond Grain Powder.

Also, SPORTING, MINING, SHIPPING, AND BLASTING POWDER,

of all kinds and descriptions.

For sale in all parts of the country. Represented by

**F. L. KNEELAND**

*70 Wall Street, NEW YORK.*

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# GUN-POWDER

**LAFLIN & RAND POWDER CO.**

**21 Park Row, New York,**

invite the attention of the the Hardware Trade to their facilities for delivering

BLASTING, MINING and RIFLE

**POWDER**

IN EVERY PART OF THE UNITED STATES from having agencies and magazines at all prominent points, beside our works at

**Newburg, Saugerties, Kingston, and Catskill, N. Y.; Scranton, Carbondale and Pottsville, Pa.; Baltimore, Md., and Platteville, Wis.**

The superiority is well known of our brands Rifle Powder

***Orange Rifle, Orange Ducking Lightning, Audubon.***

SAFETY-FUSE at wholesale.

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BARR'S ELLIPTIC

# Steam Trap

**THE BEST IN THE WORLD**

☞ SEND FOR A CIRCULAR. ☜

**Richards & Pike,**

*205 LEDGER PLACE, Philadelphia*

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# GRAHAM BROS.,

**London and Stockholm.**

Engineers, Anglo-Swedish Merchants And Engineers' Agents.

First-class Makers of **Machinery & Specialties,** &c., desirous of extending their exports, will find it to their interest to supply us with full particulars and prices, &c., &c.

**London—122 Cannon Street, E.C.**

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# HUSSEY, WELLS & CO.

MANUFACTURERS OF ALL DESCRIPTIONS OF

# CAST STEEL,

INCLUDING

**Best Refined Steel for Edge Tools.**

PARTICULAR ATTENTION PAID TO THE MANUFACTURE OF STEEL FOR

## Railroad Supplies, Homogeneous Plates

FOR LOCOMOTIVES, BOILERS AND FIRE BOXES,

Smoke-Stack Steel, Cast Steel Forgings for Crank Pins, Car Axles, &c.

ALSO, MANUFACTURERS OF THE CELEBRATED BRAND

## "Hussey, Wells & Co. Cast Spring Steel,"

**For Elliptic Springs for Railroad Cars & Locomotives.**

**PENN AND SEVENTEENTH STS., PITTSBURGH, PA.**

BRANCH OFFICES:

30 Gold St., New York. 13 & 15 Custom House St., Boston. 146 E. Lake St., Chicago.

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## Pittsburgh Steel Works.

*ESTABLISHED IN 1845.*

# ANDERSON & WOODS,

MANUFACTURERS OF

# BEST REFINED CAST STEEL,

**Cast and German Plow and Spring Steel,**

**FIRST AVE., AND ROSS ST., PITTSBURGH.**

BRANCH HOUSES

Nos. 74 and 75 North St., Boston. A. B. PARKER, 12 Cliff Street, New York.
W. F. POTTS, SON & CO., 1225 Market Street, Philadelphia.

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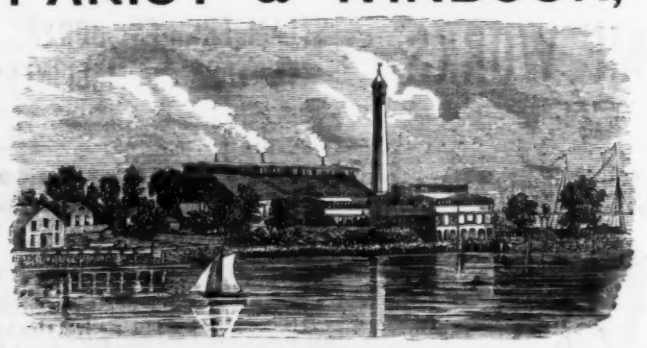
# FARIST & WINDSOR,

BRIDGEPORT, CT., 1872.



WINDSOR LOCKS, CT., 1860.

ALL DESCRIPTIONS OF

# CAST STEEL

made to order for **Cutlery, Dies, Agricultural Implements, Decarbonized Steel, Frog Plates and Points, Steel Forgings to Pattern.** Quality equal to the best. Prices as low as the market admits.

JOEL FARIST. JOHN B. WINDSOR.

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## LABELLE STEEL WORKS.

# SMITH, SUTTON & CO.,

MANUFACTURERS OF ALL KINDS OF

# STEEL.

**Also, Springs, Axles Rake Teeth, &c.**

OFFICE & WORKS, Ridge, Lighthill & Belmont Sts., & Ohio River, Allegheny.

**Post Office Address, Pittsburgh, Pa,**

FORT PITT STEEL WORKS

PITTSBURGH, PA.

**Reese, Graff & Woods.**

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# JOHN A. GRISWOLD & CO.,

**Troy, N. Y.,**

**Office in New York City, 56 BROADWAY.**

MANUFACTURERS OF

# Bessemer Railway Steel,

**MERCHANT BARS, TIRE AND SHAFTING,**

## Railroad Iron, Pig Iron, Merchant and Ship Iron,

AGENCIES IN BOSTON AND PHILADELPHIA.

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## Chain.

# New England Chain Works

**771 Eddy Street, Providence, R. I.**

Manufacture **Iron Chain** of every description.

**Mowing Machine, Crane, Break Draft Chains, &c., &c.**

Also, **Latest Improved Cotton Can Rings.**

**THOS. WYATT, Proprietor.**

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# BUFFALO

## Bellows Factory and Planing Mill.

ESTABLISHED 1852.

## JOSEPH CHURCHYARD,

# Contractor, Builder

AND

# Manufacturer,

## CLINTON, cor. ADAMS STS.,

**Buffalo, N. Y.**

## SASH, BLINDS, DOORS,

Cisterns, Tanks, Stairs, Hand Rails, Newels, Mirror Frames, Mantels, Curtain Cornices, Book Cases, Veneered Doors, Mouldings, and complete interior and exterior finish for houses.

## ROUGH AND PLANED LUMBER,

Flooring, Siding, Shingles, Lath and Fence Posts.

## Blacksmiths' & Moulders' Bellows.

---

## TUCKER & DORSEY,

MANUFACTURERS.

**Indianapolis, Ind.**

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## CHICAGO.

*(Reported by Frank Sturges & Co., 72, 74 & 76 Lake St.)*

**Tin Plate.—**

| | | | |
|---|---|---|---|
| 10x14, IC, Ch'l. Good. | $ | | |
| 10x14, IC, " Best. | 12 00 | | |
| 10x14 IX, " " | 14 50 | | |
| 12x12, IC, " " | 12 50 | | |
| 14x12, IX, " " | 15 00 | | |
| 14x20, IC, " " | 13 00 | | |
| Roofing IC, Charcoal, Best | | 11 50 | |
| Roofing IX, Charcoal " | | 14 00 | |
| 20x28, IC, Charcoal Roofing, Com | | 22 00 | |
| 20x28, IC, " | Fair | 22 50 | |
| 20x28, IC, " | Best | 23 00 | |
| 20x28, IX, " | " | 27 50 | |
| 10x14, IC, Coke Plates | 10 00 @ | 10 50 | |
| 14x20, IC, " | 10 50 @ | 11 00 | |
| 10x20, IC, " | | 17 50 | |

**Block Tin.—**

| | | | |
|---|---|---|---|
| Large Pigs | 30c | Bars | 32c |
| Small | 31c | Straits, 2c. higher. | |

**Zinc.**—Sheet, 500 to 1000 lb. Casks 10¼c; Loose Sheets 11c; Slab Zinc or Spelter 6¾ to 7¼c

**Copper.**—Bottoms 33c; Sheathing 38c; Planished 38c; " Boiler lengths 40c; Ingot 24c to 26c; Bolt 35c

**Braziers' Sheets.—**

| | | | |
|---|---|---|---|
| 30x60, 6 to 8 lbs. | 38c | 30x60, 15 to 100 lbs. | 32c |
| 30x60, 10 & 12 lbs. | 35c | | |

**Solder.**—F. S. & Co.'s make.

| | |
|---|---|
| Best Fine | 22c |
| No. 1 | 20c |
| Roofing | 18c |
| Braziers' or Spelter Solder | 32c to 35c |

**Antimony** 16c

**Babbit Metal**—F. S. & Co.'s. 16c; No. 2 14c

**Sheet Iron.—**

| | Common. | Smooth Com. | Smooth Charcoal. | Smooth Juniata. |
|---|---|---|---|---|
| No. 24 | 4¾c | 6 c | 7¾c | 9¾c |
| 25 & 26 | 5 c | 6¼c | 7¾c | 9¾c |
| 27 | 5¼c | 6¾c | 8 c | 10 c |

**Galvanized Iron** dis 25 %

| | | | |
|---|---|---|---|
| No. 16 to 20 | 12c | No. 27 | 15c |
| 21 to 24 | 13c | 28 | 16c |
| 25 & 26 | 14c | | |

**Russia Iron.—** Perfect 19c; No. 1 Stained; In sheets, 1c higher.

**American Russia.—** A 14c; B 11c; In sheets, 1c higher.

**Lead.—**

| | | | |
|---|---|---|---|
| Pig | 7¾c | Lead Pipe, in full coils | 8¼c |
| Bar | 8¾c | Lead Pipe, when cut | 8¾c |
| | | Sheet Lead | 8¾c |

**Wire**—Bright dis 25 %; Coppered dis 50 %

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## BOSTON.

*(Reported by Macomber, Bigelow & Dowse, 156 to 164 Oliver St.)*

**Augers.**—Watrous Ship dis 10 %; Hommedieu Ship dis 15 %

**Axes.**—Forester's Favorite, Bronzed $12 00; Blue Jackets, Blue 11 5; Excelsior, Black 11 00; Chopper's Pride, Bronzed 10 50; Red Cross, Red 10 00; Red Cross, Handled 12 50; Boy's Handled Blue Jackets 13 00

**Axe Handles.**—Wadleigh's Oak—A (Extra) $2·50. B (No. 1) $2·00. C (No. 2) $1·50 ₩ doz

**Bells, Sleigh—**

| | |
|---|---|
| Fancy Body, Patent Leather, Cloth Bound, White Metal, 30, No. 1 | $1·70 |
| Fancy Body, Patent Leather, Cloth Bound, White Metal, 36, No. 1 | 1·80 |
| Fancy Body, Patent Leather, Leather Bound, Extra Tinned, 30, No. 1 | ·88 |
| Fancy Body, Patent Leather, Leather Bound, Extra Tinned, 36, No. 1 | 2·50 |
| Fancy Body, Patent Leather, Leather Bound, Silver Plated, 30, No. 1 | 2·38 |
| Fancy Body, Patent Leather, Leather Bound, Silver Plated, 36, No. 1 | 3·50 |
| Shaft, Strap, White Metal, House Bells, extra, 6, No. 1 | per pair, 60c. |
| Common, 6, No. 1 | 45c. |

**Blind Hinges.—** Orr or Washburn's per hundred sets $9 50

**Blind Fasts.—** Orr or Washburn's per hundred set $6 00

**Bolts.**—Carriage, Phila., " Girard Works dis 50& 10 %

**Borax.**—Best Refined ₩ lb 14c

**Borers.**—Angle, Backus' dis 30 %

**Boring Machines.**—Angle each $4 75; Common, Snell's quality each 3 75

**Braces.**—Barber's dis 40& 5 %; Backus' dis 50 %; Spofford's dis 50 %; Amlson dis 50 %

**Brackets.**—Star Bronzed dis 50& 10 %; Star Japanned dis 60& 10 %; Store Shelf dis 35 %

**Brass Faucets.**—L. F. & C. dis 25 %

**Butts.**—Union Drilled Loose Joint dis 45& 10 %; " " Wire Fast Joint dis 25& 10 %; " " Acorn Loose Joint dis 40& 10 %; Brass Butts dis 30 %; Wrought Table Butts and Back Flaps dis 30& 10 %; Wrought Narrow Butts dis 30& 10 %

**Can Openers**—Sprague's dis 50 %

**Cartridges.**—" U. S. Cartridge Co." dis 50& 10 %

**Chisels.**—"Buck Bros.' Shank Goods add 20 @ 22½ %; Socket add 22½ @ 25 %

**Churns.**—Lightning—

| | | | | | |
|---|---|---|---|---|---|
| Redheffer patent | 3 | 4 | 5 | 6 | gall |
| | per doz $22 00 | $27 00 | $31 50 | $36 00 | |

**Coal Hods** dis 35 %

Fancy Japanned, No. 4, 15 in., $8·00; 5, 16 in., $9·00; 6, 17 in., $10·00.

Fancy Galvanized, No. 4, 15 in., $11·50; 5, 16 in., $13·00; 6, 17 in., $14·00.

Perfection, Jap'd, No. 4, 15 in., $12·00; 5, 1 in., $13·00; 6, 17 in., $14·00.

Perfection, Galv'd, No. 4, 15 in., $15·00; 5, 16 in., $16·00; 6, 17 in., $17·00.

Morning Glory, Jap'd, No. 4, 15 in., $12·00; 5, 16 in., $13·00; 6, 17 in., $14·00.

Morning Glory, Galv'd, No. 4, 15 in., $15·00; No. 5, 16 in., $16·00; No. 6, 17 in., $17·00.

**Compasses and Dividers.**—Bemis' dis 35 %; P. S. & W. dis 25 %

**Cordage.**—Manila (usual trade dis.) ₩ lb, 14½c; American Tarred Hemp Lath Yarn ₩ lb, 10c

**Corn Hooks** per doz $2·75

**Cow Ties** dis 10 %

| | | | | | |
|---|---|---|---|---|---|
| No. 30, Open Ring, | 3 | foot, | No. 6, with Toggle | | $3·70 |
| No. 35, | " | 3 | " No. 6, " | Snap | 3·90 |
| No. 40, | " | 3½ | " No. 5, " | Toggle | 4·23 |
| No. 45, | " | 3½ | " No. 5, " | Snap | 4·40 |
| No. 50, | " | 4 | " No. 4, " | Toggle | 4·85 |
| No. 55, | " | 4 | " No. 6, " | Snap | 5·00 |
| No. 60, | " | 4½ | " No. 3, " | Toggle | 5·60 |
| No. 65, | " | 4½ | " No. 3, " | Snap | 5·80 |

**Crow Bars.**—Iron. Steel Points ₩ lb, 5½c; "Sweet" Steel Bars ₩ lb 11c; Brown's Steel Bars ₩ lb 10c; K. F. & Co. Extra Drill Steel ₩ lb 15c

**Dividers.**—Cook's Nickel Plated dis 15 %

**Door Springs.**—Stimson's Patent.—

| | | | |
|---|---|---|---|
| No. 7, Light | inside doors, | $12·00 | dis 25 % |
| No. 8, " | outside " | $18·00 | dis 25 % |
| Torrey's | | | $4·00 |

**Egg Beaters.**—Lightning, Redheffer pat. 1 qt., per doz $8 00; 2 qts., $12 00

**Emery.**—Alden ₩ lb 6½c; Wellington Mills ₩ lb 10c

**Files.**—Earl Smith & Co.'s English $5 to £ gold; American $5 to £ currency, less 12½ %; Nicholson new net list; Wheeler, Madden & Clemson £5 net; Stubb's Tapers, genuine, 3 in., $1·50; 3½, $1·62; 4, $1·88; 4½, $2·13; 5, $2·50.

**Funnel Irons.**—$2·50 2·50 2·50 3·25 per doz; 5, 5½, 6, 7 inch. Deep Flange—$2·50 3·25 4·00; 5, 5½, 6 inch.

**Hammers.**—Maydole dis 5 %; M., B. & D., solid cast steel, adze eye, No. 1, $10; 1½, $8·75; " " " " " bell face, No. 1, $11; 1½, $9·75.

**Hangers & Rollers.**—Novelty dis 30 %; Anti-Friction $1 75 per pair—dis 30 %

**Hatchets.**—Underhill Edge Tool Co. dis 15 %; C. F. Dowse, warranted Cast Steel—Shingling 0, $4·75; 1, $5·25; 2, $5·75; Claw 1, $5·75; 2, 6·25; Lathing 1, $5·50; Axe Pattern 1, $7·00; 2, 7·50; Broad 0, $5·25; 1, $6·50; 2, $7·50; 3, $9·25; 4, $10·75; 5, $12·75; 6, $14·75.

**Hinges.**—Strap and T, Stanley Works dis 35& 13 %; Plate, Loose and Fast Joint ₩ lb 6c; Wrought Screw Hook ₩ lb 6½c

**Knobs.**—Young's Imp. Silverd Glass dis 50 %

**Lanterns.**—Tubular No. 0 $9·50; Guarded. No. 74, (with kerosene oil and candle burners) 6·25

**Lead.**—Sheet and Pipe 9c—less 10 %

**Locks.**—Norwalk Lock Co. dis 45& 5 %

**Mattocks.—**

| | |
|---|---|
| E. P. & Co.. axe finish, long cutter | $13 00—dis 10 % |
| Short cutter | 12 75—dis 10 % |

**Meat Cutters.**—" Miles's" Challenge dis. 30 %; No. 1, $22·00; 2, $30·00; 3, $40·00.

**Metal.**—10d and larger—qls 15c 100 keg lots $8 50

**Nail Pullers.**—Little Giant—Small per doz., $22·00; Little Giant—Large " 30·00

**Padlocks.**—Wilcox dis 45& 5 %; All Brass, 2½ inch, 2 keys, job lot $9 00

**Paper.**—Tar'd Sheathing ₩ lb 2 c; Dry Sheathing " 3½c; " " "Beaver Brand" Rosin Sized " 4½c; Tar'd " " " " 3½c; Felt " " " " 4½c

**Picks.—**

| | | |
|---|---|---|
| K. P. & Co. Axe Finish | ₩ doz | 5 to 6 $8·50; 6 to 7 $9·00 |
| " " | Solid Eyes | 5 to 6 6 to 7 |
| | | $9 00 $9 50 |

**Pins.**—Universal Hat and Coat all wood—2 in. ₩ gross $2 50; 3 in., 3 50; 4 in., 4 50—dis 15 %

**Potato Digger.—** " Partridge," 6 square tine ₩ doz $12 00; Shumway & Co., 6 round tine ₩ doz 9 00

**Pulleys.**—Axle 1¼ No. 18, 31c; 1¼ No. 18, 33c; 1¾ No. 28, 42c; 2 No. 29, 49c. Nashua, Bronzed Face 1¼, 30c; 2, 90c; Steel Axle " 2, $1·00

**Pulley Blocks.**—" Best Boston Make" net; Common Strapped Blocks—

| | | | | |
|---|---|---|---|---|
| 4 | 5 | 6 | 7 | inch. |
| Single, 75c. | 85c. | $1·00 | $1·13 | each. |
| Double, $1·00 | 1·12 | 1·25 | 1·60 | " |

Inside Iron Strapped Blocks—

| | | | | | | |
|---|---|---|---|---|---|---|
| 5 | 6 | 7 | 8 | 7 | 10 | inch. |
| Single, $1·00 | 1·13 | 1·25 | 2·00 | 2·25 | 1·75 | each. |
| Double, 1·88 | 2·30 | 2·65 | 3·63 | 4·00 | 5·00 | " |

Inside Iron Strapped Blocks, with Patent Roller Bushings—

| | | | | | | |
|---|---|---|---|---|---|---|
| 5 | 6 | 7 | 8 | 9 | 10 | inch. |
| Single, $1·25 | 1·50 | 1·65 | 2·50 | 2·65 | 3·50 | each. |
| Double, 2·50 | 3·00 | 3·38 | 4·63 | 5·00 | 6·50 | " |

**Plated Ware.**—Rogers Bros. dis 50 %

**Plumb & Levels.**—" Davis" Pat. Adjustable—No. 1, Iron and Wood Center Levels dis 60& 10 %; No. 2, First Quality Levels dis 60& 10 %; No. 3, Iron Pocket dis 35 %; No. 4, Level and Plumb Glasses dis 60& 10 %; No. 5, Iron Pocket Levels, per square and straight edge dis 50& 10 %; No. 6, Improved Iron Bench Planes dis 20& 10 %

**Pocket Knives.**—Conn. Cutlery Co. new net list; American Shear Co. dis 33⅓ %

**Rail Karn Door.**—For Novelty and Anti-Friction Hangers per foot 7c. dis 30 %

**Rivets.**—Black dis 25 %; Carriage, oval head, Nos. 3 4 5 6 7 8.

| | | | | | | |
|---|---|---|---|---|---|---|
| 13 | 13 | 14 | 14 | 15 | 16c | ₩ lb net |

**Rubber Moldings.**—" Harmon's" dis 10 %; No. 2, for Windows per foot, 5c; No. 3, for Doors per foot, 10c; No. 4, " per foot, 12c

**Sad Irons.**—Bliss & Drake ₩ lb 3½

**Sand Paper**—0 to 2, $4·25; 2 to 3, $4·75 dis 10 %

**Saws.**—*Hand and Panel*—Wheeler, Madden & Clemson's, same list as "Disston's" dis. 15 %; Disston's dis. 13¼ %; *Cross Cut*—Wheeler, Madden & Clemson X Cuts per ft., 87c; " " " "Star" X Cuts. " 60c; " " " Champion X Cut. " 50c; " " " One Man X Cut, each, $2·25; Boynton's genuine Lightning X Cut per ft., 60c; " " One Man X Cut, each, $2·25; Circular—Wheeler, Madden & Clemson's dis. 25 %; Mill— " " " dis. 25 %

**Screws.**—American Screw Co. revised list dis 62½ %; Alken's dis 60& 10 %

**Scythe Stones.—** "Willoughby Lake," first quality ₩ gross $6·50; " " second quality " 3·00

**Shovels.**—O. Ames new list dis 12½ %; M. B. & D. new list dis 12½ %; Snow, Malleable Iron Tip, D Handle—Agents for New England, 1c. higher $6·50; Snow, Malleable Iron Tip, long Handle—Agents for New England 5·50

**Sifters.**—Coal, Rice, &c. $12 00

**Spading Forks.**—M. & E. dis 25 %

**Stone Pickers.**—" Partridge," original ₩ doz $15 00; " Black Diamond" $5·00 per doz

**Tools.**—Aiken's Pattern, 20 in set; Parr's $6·00 per doz

**Traps.**—Oneida dis 20 %; Blake's dis 30 %

**Vises.**—K. P. & Co.'s Solid Box. Hackemith ₩ lb 13c; Parker's Parallel dis 10 %; Backus dis 25 %; "Howards." Parallel dis 20 %

**Wardrobe Hooks.**—Wire to drive ₩ gross $1 00

**Weather Strips.**—" Harmon's" per doz $5, 42½ 10 %

**Weights.**—Winslow Weights ₩ lb 2½c

**Wedges**—Axe ₩ doz 38c

**Wire.—** Eureka, in spools, No. 28 to 40 assorted ₩ gross $3 50

**Wire Netting.**—Clinton Wire Cloth Co., Green, Drab or Black ₩ ft 5½c

**Wrenches.**—Genuine Wrenches, G. A. Coes dis 40& 5 %; Walton dis 50 %

**Wringers.—**

| | | | |
|---|---|---|---|
| Novelty and Universal | Tub No. 2 | Less than 2 doz, | $64 00 |
| | | 2 doz or more, | 62 00 |
| Bench A | less than 2 doz | $82 00; 2 doz or more | $80 00 |
| " B | " " | 90 00 " " | 88 00 |
| " C | " " | 148 00 " " | 146 00 |

Eureka per doz $58 00

Withington, Cooley & Co.—Hoes, Rakes, Forks, &c. dis 33⅓ %

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## Boston Metal Market.

*(Corrected by Fuller, Dana & Fitz.)*

**Tin Plates.**—₩ box

| | |
|---|---|
| I. C. Char. 10x14 | @ $9·25 |
| I. C. Coke 10x14 | 9 00 |
| Char. Roof. IC, 14x20 | 10 25 |
| Coke " IC, 14x20 | 10 25 |

**Pig Tin.**—₩ lb

| | |
|---|---|
| Banca | 31c |
| Straits | 24¾c |
| English | 24¾c |

**Zinc.**—Sheet ₩ lb 10¾c

**Iron.**—Sheet Iron, Russia " 17c; Sheet Iron, English " 9 c; " " American Refined " 5¾c; " " Galvanized " 10c; Plate Iron " 3½c; Swedish and Norway Bar Iron gold ₩ ton, $120 00; " " Shapes gold 127 50; Norway Nail Rods, first quality, gold 140 00; " " second " " 132 50; Best Refined Bar Iron 64 50; The "Burden Best" Iron 103 30; American Pig iron, Foundry, No. 1 31 00; " " No. 2 29 00; " " Gray Forge 27 00

**Copper.—**

| | |
|---|---|
| Sheathing | 33c |
| Bolt | 32c |
| Ingot | 22c |

**Lead.—**

| | |
|---|---|
| Pig | 7¾c |
| Sheet & Pipe | 8½c |

**Spelter.** ₩ lb 7¾c

**Antimony** ₩ lb 15c

---

Scotch Pig Iron ₩ ton $36 00 @ $39 00; Wrought Scrap Iron " 34 00

**Steel.—**

| | | | |
|---|---|---|---|
| Eng. Tool | 13c | German | 10c |
| American Toon | 14½c | Spring | 8 c |
| " Mach | 10c | Tire | 6½c |
| Passemer | 7½c | Sleigh Shoe | 4½c |
| | | Tor Calk | 8 c |

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## ST. LOUIS.

*Corrected weekly by Semple, Birge & Co.*

**Apple Parers.**—Conqueror ₩ doz, $1 75; Hudson's Rotary " 7 75

**Axes.**—Wm. Mann's, Red Warrior ₩ doz $14 00; Wm. Mann's, W. Stewart's " 11 00; " " C. Marshall " 10 50; " " Handled " $5 extra; " " Double Bitted " 2 50; H. L. B. & Co.'s, L. & Co. " 11 00; " " Pioneer " 12 00; " " James & Co. " 11 00; Hunt's " 12 00

**Axles.**—"Jones, Henry & Co.'s" Patent Lubricating, Half Patent, Swelled Taper, Plain Taper and Concord Axles dis 10 & 5 %; Common Axles (Pat. Lubricating), 1¼ inch and upward ₩ lb, 6½c; do. less than 1¼ inch " 7 c

**Bellows.**—Best St. Louis make, 60c ₩ in. dis 20& 2½ %

**Bells.**—Troy, Church, School and Farm Bells ₩ lb 42c; "Improved Amalgam Bronzed," 15 in $3·00; 17 in., $4·00; 19 in., $6·00 dis 10 %

**Belting.**—"Boston Belting Co.'s Rubber dis 30 %; "Bradford & Sharp's" Oak-Tanned Leather dis 20 %

**Bolts.**—Arms, Bell & Co.'s Carriage and Tire dis 75 %; Arms, Bell & Co.'s Machine dis 30 %

**Butts.**—Western Butt Co.'s new list—Narrow Fast Joint dis 25& 10 %; Broad Fast Joint dis 5& 10 %; " Loose " dis 45& 10 %; Reversible dis 40& 10 %; " Japanned and Silver Tipped dis 40& 10 %; Loose Joint " Acorn " " " dis 40& 10 %; Wheeling Hinge Co.'s W't Fast Joint Nar. dis 30& 10 %; " " " Broad. dis 35& 10 %; " " Loose Joint dis 35& 10 %; " " Reversible dis 35& 10 %; " " Table & B'k Flaps dis 30& 10 %

**Churns.**—Julian, No. 2, $7·00; No. 3, $7·50; No. 4, $8·50 dis 30 %

**Corn Knives.**—Dunn Edge Tool Co.'s Chip 5 75; Seymour Mfg. Co.'s Solid Steel Back 5 00

**Corn Shellers.**—Sandwich Mfg. Co.'s—Power Shellers dis 10 %; Hand Shellers Special rates

**Cotton Gins.**—Dubois Patent dis 10 %

**Crow Bars.**—Steel Pointed ₩ lb 6½c

**Drag Saw Machines.—** Culver's Iron Drag Saw dis 10 %; Robinson's Patent Sweepstakes Drag Saw dis 10 %

**Fanning Mills.**—Nash & Cutt's dis 15 %

**Feed Cutters.**—Improved Burdick National dis 15 %; Sanford No. 1, $12 00; No. 2, $8 75 net

**Files.**—Black Diamond, Mill $5·00 £ currency; " Bastard $5·00 £ currency; " Taper $5·00 £ currency

**Forges.**—Keystone Portable Forge Co.'s dis 12½ %

**Forks and Hoes.—** Auburn Mfg. Co.'s Hay and Manure Forks dis 33⅓ %; " " Handled Hoes dis 33⅓ %

**Garden Seed Drills and Wheel Hoes.—** Allen's Double Wheel Hoe dis 15 %; " Planet Drill, Nos. 2 and 3 dis 15 %; " Combined Drill and Wheel Hoe dis 15 %

**Grinding Mills.**—French Burr Mills net list; Challenge Feed Mills dis 20 %; Sedgebeer's Nonpareil Mills dis 10 %; Osage Corn and Cob Mill dis 20 %

**Hammers.**—Masons' Hammers ₩ lb 20c; Smiths' Hand 20c

**Handles.**—No. 1 Fork, Hoe and Rake dis 20 %; No. 2 Fork, Hoe and Rake dis 40 %

**Harrow Teeth.**—1 inch iron ₩ lb 4½c; ⅞ and ¾ inch iron " 4¾c; Barbed or Headed " ½c extra

**Hay and Cotton Presses.—** Dederick's Railroad dis 5 %; " Perpetual net

**Hay Knives.—** Dunn Edge Tool Co.'s ₩ doz $15 00—dis 15& 5 %; Lightning (Weymouth's Patent) ₩ doz $30 00

**Hinges.—** Wheeling Hinge Co.'s Strap & T dis 3, 10& 5 %

**Horse Hay Fork.**—Neills' Harpoon dis 25 %

**Horse Nails.**—National Patent Pointed 20c rates; National Patent Pointed, extra finished 22c "

**Horse Powers.**—Pitts or Carey's Patent dis 10 %; Wheeler's Railway dis 10 %; Sandwich Lever dis 10 %

**Horse Rasps.**—Heller Bros. dis 45 %; "Black Diamond" $5·00 to the £ currency

**Horse Shoes.—** Rhode Island (Perkin's Pattern) ₩ keg, $6 25; " Mule " 7 25; " Trotting Shoes " 6 75; Tredegar Horse per keg $6 25; " Mule per keg 7·25

**Hose.—** Boston Belting Co.'s Rubber Medium Sizes dis 25& 5 %; " " ½x2 inch dis 25& 15 %

**Ice Tools.**—W. T. Wood & Co.'s Saws new list net; W. T. Wood & Co.'s Chest Hatchets new list net; " " Axes new list net; " " Loading Tongs new list net; " " Medium, Small and Family Tongs new list net; " " Chisels, Hooks and Grapples new list net

**Lawn Mowers.**—Archimedean dis 20& 5 %; Charter Oak dis 30 %

**Mattocks and Grub Hoes.—** Klein, Logan & Co.'s Mattocks ₩ doz $14 75 @ 13 25; " " Grub Hoes, oval eye " 10 75 @ 12 00

**Money Drawers.—** Pierpont & Co.'s Excelsior per doz $40·00 net

**Nails.**—Wheeling $3 30 rates

**Packing.**—Boston Belting Co.'s Rubber, Plain dis 30 %; Boston Belting Co.'s Rubber, Pure dis 25& 5 %; " " No. 2 Plain dis 40 %; " " Round and Square dis 10& 10 %

**Picks.**—Klein, Logan & Co.'s Railroad and Clay ₩ doz $10 50 @ 11 75; Klein, Logan & Co.'s Coal " 8 00 @ 9 00; " " Poll " 12 00; " " Stone " 15 00; " " Tamping " 17 50

**Plows.**—Avery's Cast and Steel dis 15 %; Collins Cast Steel new list net; Pekin Steel new list net

**Post Hole Augers.**—Clark's Patent—No. 1, ₩ doz. $27; No. 2, $30; No. 3, $32 dis 30 %

**Pulleys.**—5 inch per doz $4·25 net; 4 inch per doz 3·25 net; Nellis' Patent new list dis 15 %

**Rakes.**—Paddock's Premium Sulky $30 00 net; St. Louis Revolving 14 tooth 5 50 net; " " 16 " 6 00 net; " Hand Hay Rake dis 10 %

**Reaper Knives and Sections.—** Geo. Barnes & Co.'s Knives dis 20& 5 %; " " Sections dis 25 %

**Road Scrapers.**—Steel dis 25 %; Cast Iron dis 10& 2½ %

**Sad Irons.**—Monitor Brand, Silver Polished ₩ lb 5c

**Sash Weights.**—Standard Solid Eyes ₩ lb 3½ c

**Saws.**—Branch, Crooks & Co. dis 15 %; Curtis & Co. dis 10 %

**Scythes.**—Dunn Edge Tool Co.'s new list dis 20& 5 %

**Scythe Stones.**—No. 1 Ind'a Pond ₩ gr'o, $7 00; Extra Indian Pond " 7 50; Premium " 10 50; Diamond Grit " 13 00 } dis 25

**Shovels and Spades.**—Myers & Armor dis 15 %; O. Ames & Son dis 5 %; Grain Scoops, (Pat. Corrugated Straps) M. & A. dis 15 %; " " T. Rowland's dis 15 %; " " O. Ames & Son dis 5 %

**Sledges.**—Smith's Stone or Coal Sledges—Steel Face Polished ₩ lb 15c; Solid Cast Steel " 8c

**Snaths and Cradles.**—Seymour Mfg. Co.'s dis 20 %

**Springs.**—Cleveland Spring Co.'s—Carriage and Express dis 10& 5 %; Blue Seal Springs dis 15 %

**Thimble Skeins.**—Pump & Skein Co.'s dis 6c %

**Vises.**—Solid Box ₩ lb 10c; Wilson Mfg. Co.'s dis 15 %

**Wheelbarrows.**—Railroad & Garden new list net

**Wrenches.**—Coes' Genuine dis 33⅓ %; Coes' Pattern dis 50 %

**Wagons.**—Whitewater Farm Wagons—Thimble Skein No. 3, 3.6; 3¼, $89; 3½, $91; Iron Axle No. 1½, $90; 1⅝, $92; 1¾, $95

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## St. Louis Metal Market.

*(Corrected Weekly by Messrs. R. Sellew & Co.)*

**Tin Plate.**

| | | | |
|---|---|---|---|
| IC, 10x14, Chas | 11 50 @ | 12 00 | |
| IX, 10x14, " | 13 50 @ | 14 00 | |
| IC, 12x12, " | 12 00 @ | 12 50 | |
| IX, 12x12, " | 14 50 @ | 15 00 | |
| IC, 14x20, " | 12 50 @ | 13 00 | |
| IX, 14x20, " | 15 00 @ | 15 50 | |
| IC, 14x20, Tern. | 10 50 @ | 11 00 | |
| IX, 14x20, " | | 13 50 | |
| IC, 20x28, " | 22 00 @ | 22 50 | |
| IX, 20x28, " | | 27 00 | |
| IC, continuous 30 in. x 200 ft | | | |

| | |
|---|---|
| IX, continuous, 30 in. x 200 ft | |
| IC, 10x14, best Coke | $11 00 |
| IC, 10x14, good Coke | 9 50 @ 10 00 |
| IC, 10x20 | 16 50 |
| IC, 14x20 | 11 50 |
| IC, 14x28, Coke Lead | 9 25 |
| IC, 10x14, punch'd for Safes | 10 00 |

**Block Tin.**

| | | | |
|---|---|---|---|
| Large Pigs | Straits | Bars | 30c |
| Small " | English 29c | | |

**Sheet Zinc.**

| | | | |
|---|---|---|---|
| Casks | ₩ lb 10½c | Sheet | ₩ lb 11c |

**Solder.**

| | |
|---|---|
| No. 1, Refined, in bars or plate | 17c |
| No. 2, " " " | 16c |
| Pig Lead | 7½c |

**Sheet Copper.**—18 to 100 lbs. Sheets 30x60 32c; 14 to 16 lbs., Sheets 30x60 30c; 10 to 12 lbs., " and 30x72 28c; 6 to 9 lbs., " 26c; Tinned, 14 and 16 oz. 14x48 31c; Planished, 14 and 16 oz. 14x48 36c; " No. 7, 8 and 9 33c; Copper Bottoms 32c

**Sheet Iron.—**

| | Com'n | Sm'th. | Char'l. | Juniata |
|---|---|---|---|---|
| No. 16 to 20 | 4¼c | 4¾c | 6¼c | 8c |
| No. 22 to 24 | 4¾c | 4¾c | 6¾c | 8c |
| No. 26 | 4¾c | 5 c | 6¾c | 8¾c |
| No. 27 | 4¾c | 5¼c | 7c | 8¾c |

**Galvanized Iron** dis 25 %

**Iron Rivets** dis 25 %

**Iron Wire** dis 40 %

**Coppered Market Wire** dis 35 %

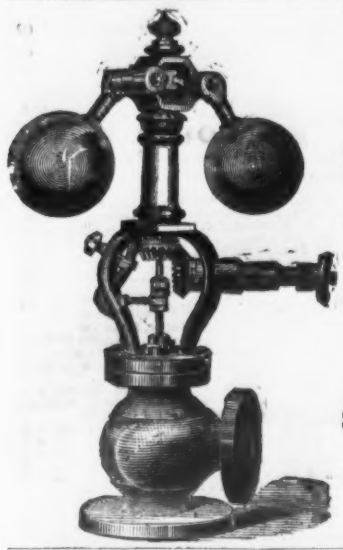
**Copper Rivets and Burs** dis 30 %

**Russia Iron.**—Nos. 9, 10, 11 and 12. ₩ lb 18c

No. 1 stained, ₩ lb 17c

Imitation Russia, ₩ lb 14c

**Retinned Stamped Ware** dis



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We will put our Governor on any Engine, and guarantee it to prove itself superior to all others.

If, after a fair trial, it does not, we will take it off at our own expense.

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BETHLEHEM, PA.

ALSO,

**SHIVE'S PATENT WATCHMAN'S CLOCK AND DETECTOR.**

The Best and Cheapest Watcher of the Watchman made

**PRICE ONLY $15.**

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February 10, 1875. REDUCED PRICE LIST OF THE

## JUDSON PATENT IMPROVED GOVERNORS,

☞ When Governors are ordered, be particular and say Governor with Stop Valve, or without Stop Valve; and either Black, Finished or Portable, as you may require, and with or without Lever Attachment.

For dimensions and other particulars send for Illustrated List.

| Capacity of Valve or Diameter of Steam Pipe in Inches. | Price, Black. | Price, Bright Finish. | Price, Portable. | Price of Lever Attachment for altering speed. | Price of Stop Valve. |
|---|---|---|---|---|---|
| ¾ | 18 00 | 20 00 | 17 00 | .. | .. |
| ¾ | 20 00 | 22 00 | 19 00 | .. | .. |
| 1 | 24 00 | 27 00 | 22 00 | 2 00 | 5 25 |
| 1¼ | 29 00 | 32 00 | 27 00 | 2 25 | 6 66 |
| 1½ | 34 00 | 38 00 | 31 00 | 2 50 | 8 50 |
| 2 | 41 00 | 46 00 | 38 00 | 2 75 | 11 50 |
| 2¼ | 47 00 | 54 00 | .. | 3 25 | 16 00 |
| 2½ | 50 00 | 57 00 | 47 00 | 3 50 | 17 00 |
| 2¾ | 55 00 | 62 00 | | 3 75 | 19 00 |
| 3 | 62 00 | 70 00 | | 4 25 | 22 00 |
| 3½ | 71 60 | 80 00 | | 4 50 | 27 00 |
| 4 | 81 00 | 92 00 | | 5 00 | 33 00 |
| 4½ | 91 00 | 103 00 | | 5 50 | 37 00 |
| 5 | 102 00 | 114 00 | | 6 00 | 42 00 |
| 5½ | 116 00 | 129 00 | | 6 50 | 48 00 |
| 6 | 134 00 | 148 00 | | 7 00 | 55 00 |
| 7 | 160 00 | 176 00 | | 8 00 | 69 00 |
| 8 | 199 00 | 219 00 | | 9 00 | 83 00 |
| 9 | 230 00 | 255 00 | | 10 00 | .. |

No Larger Portable made than 2½ in.

**No Charge for Boxing & Cartage.**

It is a common method to advertise Governors *without cost*, unless satisfactory to the customer, and then charge *High Prices* for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not, for much inferior Governors, pay higher prices than those shown in the above list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

**JUNIUS JUDSON & SON, Rochester, N. Y.**

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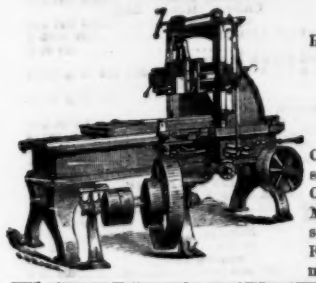
## The Pratt & Whitney Co.,

Hartford, Conn.,

Have constantly on hand and making



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Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.

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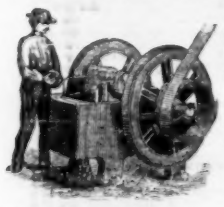
## BLAKE'S PATENT
# STONE & ORE BREAKER.

New Pattern with Important Improvements & Abundant Strength



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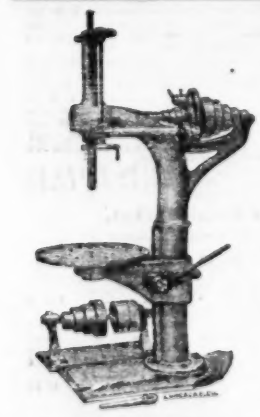

## THORNE, DeHAVEN & CO.

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## DRILLING MACHINES.

**PORTABLE DRILLS.** Driven by power in any direction, self-feed and convenient adjustment.

**RADIAL DRILLS.** Self-feed—large adjustable box table—separate base plate, every convenience.

**VERTICAL DRILLS.** Self-feeding—of new and improved designs.

**MULTIPLE DRILLS.** For boiler work, etc., 2 to 20 spindles, fed and returned by power or hand, together or separately.

**HORIZONTAL BORING AND DRILLING MACHINES.** For large pieces—with boring head, adjustable, vertically and horizontally.

**SPECIAL DRILLS.** For special work. Gun Blank Drills, Coal Drills, &c., built to order.

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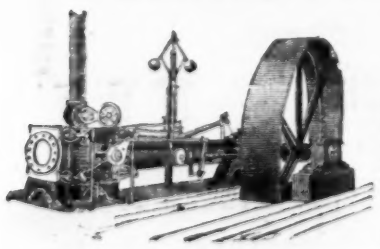
## CORLISS STEAM ENGINE.

The Best in the World for Economy in Fuel and Cost of Running.

BUILT BY



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Engineers, Machinists, Founders,

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Stationary Engines, Shafting, Mill Gearing, Hoisting Machines, Improved Piston Packing and Machinery.

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## ENTERPRISE HYDRAULIC WORKS,

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Fan Blowers.
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Our Fly Wheel STEAM PUMP is admirable For Fire Purposes.

## STEAM PUMPS for all duties required.

**Centrifugal, Hand and Power Pumps, Special Double Plunger Pumps for Mining Purposes. Boiler Feed and Tank Pumps.**

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## Woodruff Iron Works,

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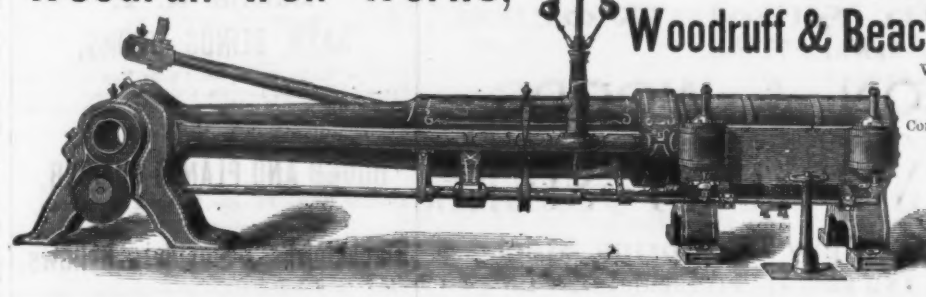
Manufacturers of the Celebrated



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With recent valuable improvements.

**Steam Boilers**

Constantly on hand and made to order any size or style. Special attention given to the manufacture of

**MILL WORK**

And all kinds of Machinery.

**CASTINGS**

Of any size or style. Direct all letters to **The Woodruff Iron Works, Hartford, Conn.**, as the Woodruff & Beach Iron Works and firm of Woodruff & Beach are both dissolved.

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## Knowles Patent Steam Pumps

MANUFACTURED BY THE

## KNOWLES STEAM PUMP WORKS,

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WAREHOUSES:

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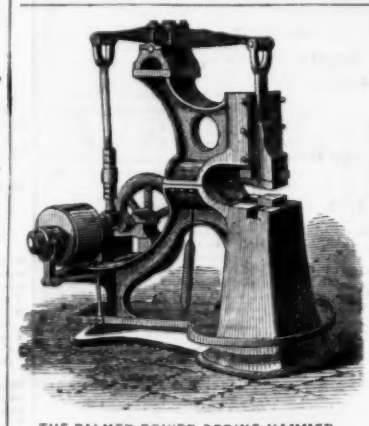
Cut above represents regular Boiler Feed Pump, No. 3 and 4. Showing New Patent Valve Motion, and Hand Power LEVER Attached and Detached.

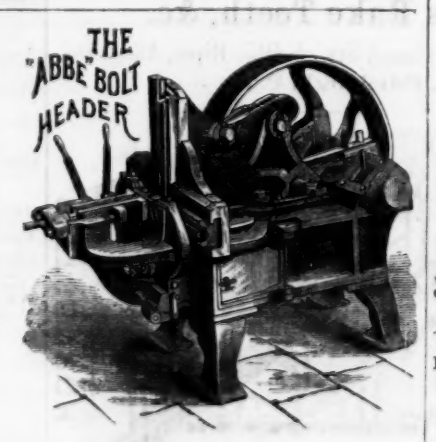
## FIRE PUMPS, a specialty.

Mining Pumps (both Double Acting Plunger, and Piston Pattern,) which we guarantee to run absolutely noiseless on any lift from 100 to 600 ft., at a single lift, a specialty. Pumps for every possible duty. Prices as low as any, and our workmanship and material altogether the Best.

Every machine furnished under a complete guarantee.



THE PALMER POWER SPRING HAMMER.




Of these Machines we are building sizes to meet the requirements of all Manufacturers and Workers of Iron and Steel. In simplicity, durability, ease of operation, accuracy, and range of work, we guarantee them superior to any Machines of their kind produced in the world. For prices, references, and full descriptive circulars, address

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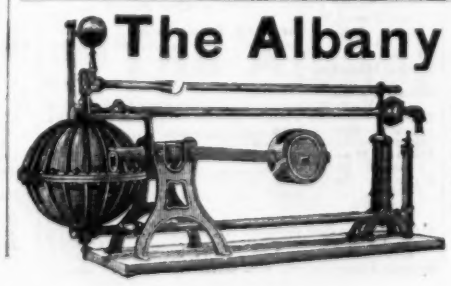
## The Albany Steam Trap.



This Trap automatically drains the water of condensation from *Heating Coils*, and returns the same to the Boiler *whether* the Coils are *above or below* the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

**TOWNSEND & BLESSING,**
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## Whittier Machine Co.,

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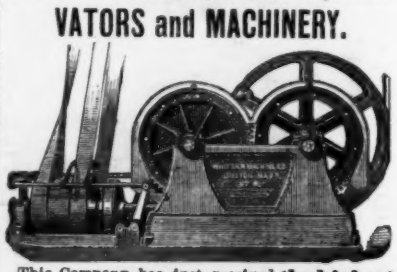
Manufacturers of

STEAM ENGINES, BOILERS, ELEVATORS and MACHINERY.



This Company has just received **the highest award, a Gold Medal, for Safety Elevators,** from the Massachusetts Charitable Mechanics Association.

CHARLES WHITTIER, Prest. JAMES STURGIS Treas.

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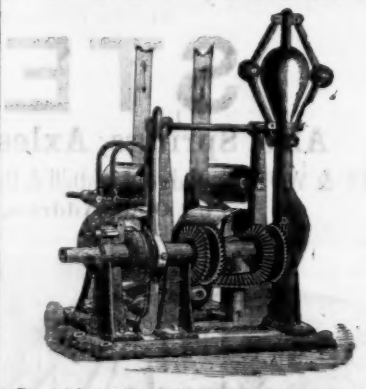
DIFFERENTIAL GOVERNOR.

## The HARTFORD GOVERNOR CO.,

Sole makers of the

Weaver Differential Governor,

FOR WATER OR STEAM.



Powerful, positive, radically new. Introduced and working with complete success. Write us for circular, etc., at

HARTFORD, CONN.

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Patented Steam and Hydraulic, April 1, 1868.

## EAGLE PACKING,

Of various sizes for **ENGINES and PUMPS,** manufactured by **JAMES GLANDING & CO., No. 115** Queen St., Philadelphia. What the proprietors claim for the Eagle Packing: 1. Its general adaptation to all purposes for which packing is used. 2. Its durability. It will outlast any other article in use. 3. Its cheapness. It can be furnished to the consumer at a lower rate than any other packing

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## JAMES HENSHALL,

**Engineer, Machinist & Blacksmith,**

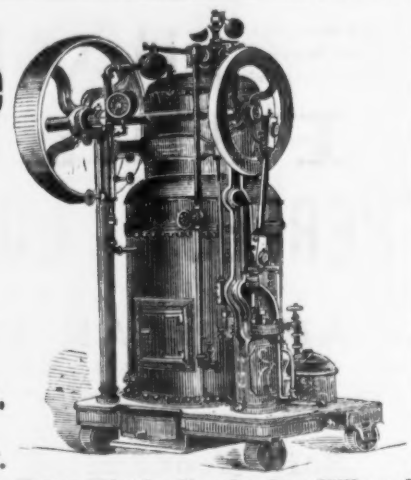
**1056 Beach St. PHILADELPHIA.**

Drawings made to order. Repairing of all kinds promptly attended to. Blacksmithing executed in all its branches.

## Machinery, &c.

THE

# Shapley Engine



*Patented Feb. 10, 1874.*

COMPACT,
PRACTICAL,
DURABLE,
ECONOMICAL.

**$200·00.**

Cheaper than any Engine offered of the same capacity.

MANUFACTURED BY

**SHAPLEY & WELLS,**
Binghamton Iron Works,
Binghamton, N. Y.

Manufacturers of **Steam Engines, Boilers, Water Wheels, Circular Saw Mills and Mill Work generally.**

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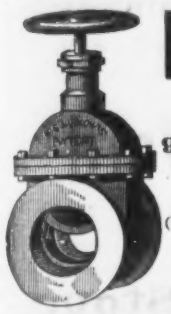

# Ludlow Valve Mfg. Co.,

*OFFICE AND WORKS:*

**938 to 954 River St. & 67 to 83 Vail Ave., Troy, N. Y.,**

## VALVES

(Double and Single Gate, ¼ in. to 48 in.—outside and inside Screws, Indicator, &c.) for Gas, Water and Steam. Send for Circular.

**Also FIRE HYDRANTS.**

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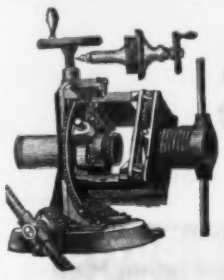

## PORTABLE PIPE AND BOLT
## Threader and Cutter

Cuts off and threads from ⅛ inch to 3 inch Pipes and Bars. Also taps Nuts and Centers work ready for Lathe. One man can thread 2 inch Pipe with ease with Dies furnished with machine. No Pipe splitting; no bevel inside or out. Requires no skilled labor.

**A Full Set of Sockets and Lengths for Making Nipples Furnished with each Machine.**

ANY SOLID DIE CAN BE USED IN THIS MACHINE.

**Send for Circular.**

**EMPIRE MFG. CO., 62 Gold Street, N. Y.**

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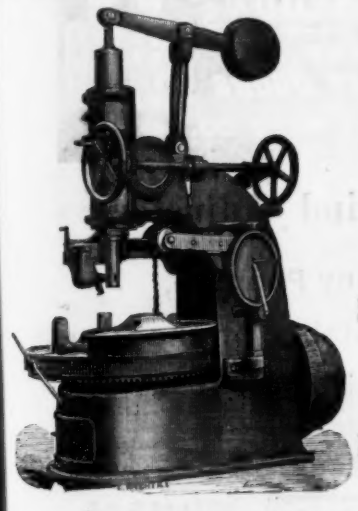

NEW-YORK STEAM ENGINE CO.
MANUFACTURERS OF
MACHINISTS' TOOLS
OF ALL DESCRIPTIONS
CHAS. A. CHEEVER, TREAS. GEO. Q. DOW, SEC'Y. No. 98 CHAMBERS ST. NEW-YORK

We have the best and most complete assortment of

## MACHINISTS' TOOLS,

in the country, comprising all those used in **Machine, Locomotive** and

## R. R. REPAIR SHOPS.

We make a specialty of manufacturing

**Gear Wheels of all Descriptions,**

which are made absolutely perfect, with **Patent Gear Molding Machine.**

☞ For Photographs, Prices and Description, etc., address

**N. Y. STEAM ENGINE CO.,**
**98 Chambers Street, New York.**

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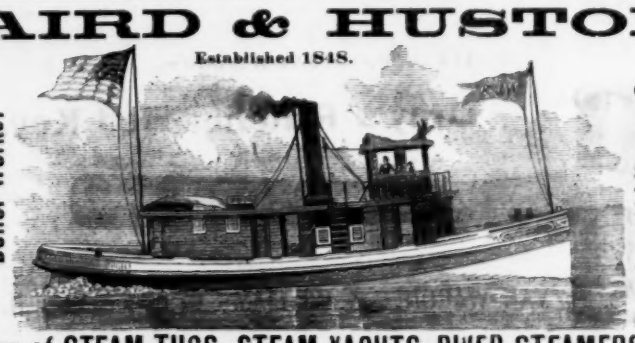
# BAIRD & HUSTON.

Established 1848.



Kensington Steam Engine AND Boiler Works. Beach and Vienna Sts., Phila., Pa., U. S.

Builders of STEAM TUGS, STEAM YACHTS, RIVER STEAMERS, &c.
**MARINE, (High or Low Pressure)**
Stationary, Hoisting & Portable Engines & Boilers. Propeller Wheels.

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# Steam Pumping Machinery

**OF EVERY DESCRIPTION.**

PHILADELPHIA HYDRAULIC WORKS, Cor. Evelina & Levant Sts., PHILA.

Send for Descriptive Price List.

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# STURTEVANT

Pressure Blowers, Fan Blowers
and Exhaust Fans.

## 10,000 SOLD IN SIX YEARS.

SEND FOR ILLUSTRATED CATALOGUE.

B. F. STURTEVANT, 72 Sudbury Street,
BOSTON, MASS.

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## Machinery, &c.

Established 1848.

# WM. SELLERS & CO.,

1600 Hamilton Street, PHILADELPHIA.,

## Engineers, Iron Founders and Machinists.

RAILWAY SHOP EQUIPMENTS.

Our Steam Hammers, Lathes, Planers, Drills and Bolt Cutters
**Are of Improved and Patented Construction.**

**Railway Turning and Transfer Tables,**
SHAFTING & MILL GEARING, a specialty.

## Pivot Bridges.

☞GIFFARD'S INJECTOR--IMPROVED, SELF-ADJUSTING.☜

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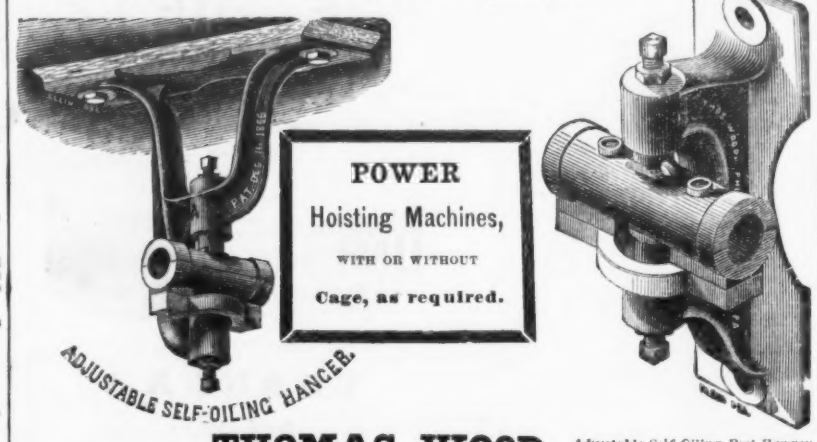
# Fairmount Machine Works,

Office, 2106 Wood St., Philadelphia, Pa.



**POWER**
Hoisting Machines,
WITH OR WITHOUT
**Cage, as required.**

ADJUSTABLE SELF-OILING HANGER.

**THOMAS WOOD,** *Adjustable Self-Oiling Post Hanger 6 in. from post to center of shaft.*

MANUFACTURES AS SPECIALTIES,

**POWER LOOMS, with (new) Patent Box Motion. SPOOLING, BEAMING, DYEING and SIZING MACHINES.**
**BOBBIN WINDING MACHINES—wind direct from hank or skein to shuttle bobbin.**
**SHAFTING, with Patent Adjustable Self-Oiling Bearings.**
**PLANS taken, and FACTORIES fitted out complete with Shafting and Gearing.**
**PULLEYS, from 4 inch to 10 feet diameter, of most Approved Pattern.**
**SELF-ACTING WOOL SCOURING MACHINES, (Yewdall's Patent.)**
**Machine and Foundry Work in all their branches.** Send for Price List of Pulleys & Shafting.

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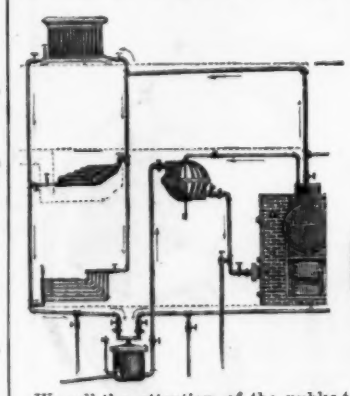
# AUTOMATIC
# STEAM TRAP WORKS.



## C. A. PROUTY,

Inventor and Patentee.

Address,

## Geo. W. Harrold,

**ROCHESTER, N. Y.**

We call the attention of the public to a novelty in the shape of an Automatic Steam-Trap, which returns in a continuous stream, and at a high temperature, the water of condensation, together with steam from the radiating pipes, to the boiler, below the water line. Keeping the pipes free from water prevents strain and leakage, and increases their radiating power. With this arrangement the engineer will find his labor materially lessened, since the same supply of water is converted into steam, condensed and returned to the boiler repeatedly, so that the loss of water is consequently very small, and an expensive pump is not required. This trap, which has been in operation for two years, is simple in construction and practical in application; there are no levers, weights, cranks, diaphragms or pistons to get out of order. It is self-operating, thus requiring very little attention, and will work with one radiator or twenty, only one size being needed. It is perpetual in its motion, and therein unlike other traps whose actions are spasmodic.

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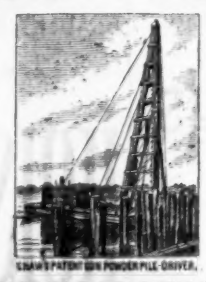
# THE AMERICAN DREDGING CO.

PATENT IMPROVED "GRAPPLE-DREDGE."



SHAW'S PATENT GUN POWDER PILE-DRIVER.

IMPROVED "DIPPER-DREDGE."

BUILDERS OF STEAM DREDGING MACHINES,
**GUNPOWDER PILE-DRIVERS, &c.**

CONTRACTORS FOR

IMPROVING RIVERS AND HARBORS,
**EXCAVATING CANALS,**
RECLAIMING AND FILLING LOW LANDS,
**PILING FOR FOUNDATIONS, PIERS, Etc.**

***Offices, No. 10 South Delaware Ave., Philad'a.***

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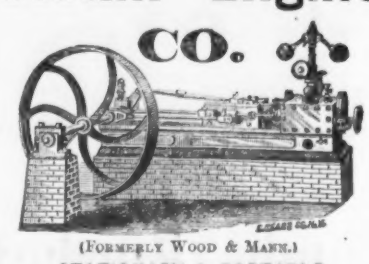
## Machinery, &c.

# UTICA
# Steam Engine
# CO.



(FORMERLY WOOD & MANN.)

STATIONARY & PORTABLE

## STEAM ENGINES

**The best and Most Complete Assortment in the Market.**

These Engines have always maintained the very highest standard of excellence. We make the manufacture of Engines, Boilers and Saw Mills a specialty. We have the largest and most complete works in the country with machinery specially adapted to the work.

We keep constantly in process large numbers of Engines, which we furnish at the very lowest prices and on the shortest notice. We build Engines specially adapted to Mines, Saw Mills, Grist Mills, Tanneries, Cotton Gins, Threshers and all classes of manufacturing.

We are now building the celebrated Lane Circular Saw Mill, the best and most complete saw mill ever invented.

We make the manufacture of Saw Mill Outfits a special feature of our business, and can furnish complete on the shortest notice.

Our aim in all cases is to furnish the best machinery in the market, and work absolutely unequalled for design, economy and strength.

Send for Circular and Price List.

**UTICA STEAM ENGINE CO.,**
**UTICA, N. Y.**

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## LATHES, PLANERS,

and other

# Machinists' Tools.

For Sale by

## New Haven Mfg. Co.,

NEW HAVEN, CONN.

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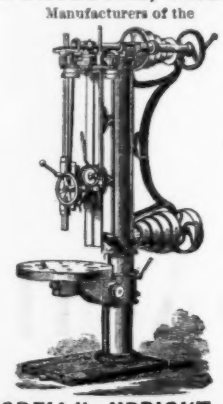
## P. BLAISDELL & CO.,

**WORCESTER, MASS,**

Manufacturers of the



**'BLAISDELL" UPRIGHT DRILLS,**

**And other First-Class Machinists' Tools.**

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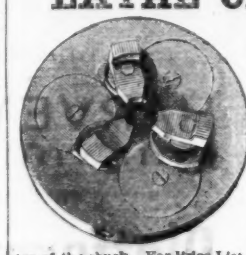
## JOHNSON'S PATENT UNIVERSAL
## LATHE CHUCK.



We invite attention to the superior construction of this chuck. Its working parts are **absolutely protected from dirt and chips.** It is strong, compact and durable, and will hold the greatest variety of work, as the jaws are adjustable with range the full diameter of the chuck. For Price List address,

**Lambertville Iron Works, Lambertville, N. J.**

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### LIST OF HARDWARE DEALERS.

Having compiled a complete list of the **Hardware Dealers** in the United States, expressly for addressing circulars, I am prepared to receive orders for addressing **ENVELOPES, CIRCULARS, &c.** The printed address is cut from the list and stamped upon the envelope or wrapper, thus enabling me to address a great number in a short space of time, and at rates far below the prices usually paid for this work. It answers all purposes, and can be done for one-third the expense of addressing by hand. My list contains names of over 4000 dealers, each State, city and town therein, being compiled separately. Wholesale Dealers and Manufacturing Co.'s, whose custom it is to send out circulars price lists, &c., to the trade throughout the States cannot fail to find my list and style of addressing a great advantage to them, as it is a great saving of both time and expense. It has been tried by a large number in the trade, some of whose names appear at the bottom of this circular and to any of whom I would most respectfully refer. My rate for addressing is $2·50 per M. Envelopes, &c., sent to the address below, will receive prompt attention, and will be addressed and returned at once, or envelopes, &c., will be furnished at market prices. For further information, address,

**CHAS. B. SMITH,** No. 115 Broad St., N. J.

REFERENCES.

Union Nut Co., 73 Beekman St.; L. Boardman & Son, 82 Chambers St., Millers Falls Co., 73 Beekman St., L. M. Boynton, 80 Beekman St., Yale Lock Mfg. Co., N. Y.

P. S.—Copies of my list will be forwarded to any address throughout the U. S. upon receipt of $3·00.

NEW YORK, February 26, 1874.

## TO ALL WHO USE STEAM-POWER!

We will put our Governor on any Engine, and guarantee it to prove itself superior to all others.

If, after a fair trial, it does not, we will take it off at our own expense.

# Shive Governor Co

BETHLEHEM, PA.

ALSO,

**SHIVE'S PATENT WATCHMAN'S CLOCK AND DETECTOR.**

The Best and Cheapest Watcher of the Watchman made

**PRICE ONLY $15.**

Circulars sent free

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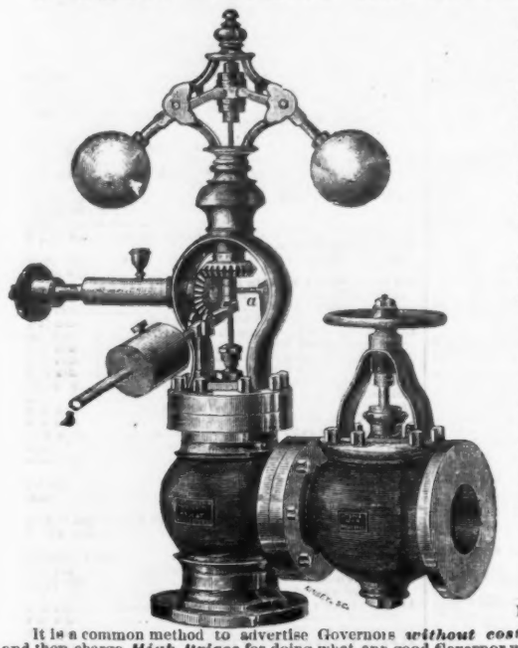
February 10, 1875. REDUCED PRICE LIST OF THE

# JUDSON PATENT IMPROVED GOVERNORS.



☞ When Governors are ordered, be particular and say Governor with Stop Valve, or without Stop Valve; and either Black, Finished or Portable, as you may require, and with or without Lever Attachment.

For dimensions and other particulars send for Illustrated List.

| Capacity of Valve or Diameter of Steam Pipe in Inches. | Price, Black. | Price, Bright Finish. | Price, Portable. | Price of Lever Attachment for altering speed. | Price of Stop Valve. |
|---|---|---|---|---|---|
| ½ | 18·00 | 20·00 | 17·00 | .. | .. |
| ¾ | 20·00 | 22·00 | 19·00 | .. | .. |
| 1 | 24·00 | 27·00 | 22·00 | 2·00 | 5·25 |
| 1¼ | 29·00 | 32·00 | 27·00 | 2·25 | 6·64 |
| 1½ | 34·00 | 38·00 | 31·00 | 2·50 | 8·50 |
| 2 | 41·00 | 46·00 | 38·00 | 2·75 | 11·50 |
| 2¼ | 47·00 | 54·00 | .. | 3·25 | 16·00 |
| 2½ | 50·00 | 57·00 | 47·00 | 3·50 | 17·00 |
| 2¾ | 55·00 | 62·00 | | 3·75 | 19·00 |
| 3 | 62·00 | 70·00 | | 4·25 | 22·00 |
| 3½ | 71·00 | 80·00 | | 4·50 | 27·00 |
| 4 | 81·00 | 92·00 | | 5·00 | 32·00 |
| 4½ | 91·00 | 103·00 | No Larger Portable made than 2½ in. | 5·50 | 37·00 |
| 5 | 102·00 | 114·00 | | 6·00 | 42·00 |
| 5½ | 116·00 | 129·00 | | 6·50 | 48·00 |
| 6 | 134·00 | 148·00 | | 7·00 | 55·00 |
| 7 | 160·00 | 176·00 | | 8·00 | 69·00 |
| 8 | 199·00 | 219·00 | | 9·00 | 83·00 |
| 9 | 230·00 | 255·00 | | 10·00 | .. |

**No Charge for Boxing & Cartage.**

It is a common method to advertise Governors *without cost*, unless satisfactory to the customer, and then charge *High Prices* for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not, for much inferior Governors, pay higher prices than those shown in the above list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

**JUNIUS JUDSON & SON, Rochester, N. Y.**

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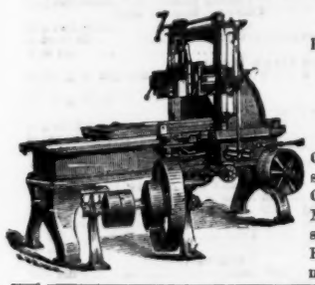
# The Pratt & Whitney Co.,

Hartford, Conn.,

Have constantly on hand and making



## Drop Hammers

Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.

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## BLAKE'S PATENT

# STONE & ORE BREAKER.

New Pattern with Important Improvements & Abundant Strength

For reducing to fragments all kinds of hard and brittle substances, such as STONE for making the most perfect McADAM ROADS, and for making the best CONCRETE. It breaks stone at trifling cost for BALLASTING RAILROADS It is extensively in use in MINING operations, for crushing

**IRON, COPPER, ZINC, SILVER, GOLD, and other ORES.**

Also for crushing **Quartz, Flint, Emery, Corundum, Feldspar, Coal, Barytes, Manganese, Phosphate Rock, Plaster, Soapstone, &c.**

For Illustrated Circulars, and particulars, address,

BLAKE CRUSHER CO., New Haven, Conn.

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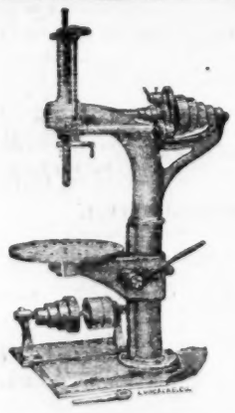

## THORNE, DeHAVEN & CO.

21st Street, above Market,
PHILADELPHIA.

## DRILLING MACHINES.

**PORTABLE DRILLS.** Driven by power in any direction, self-feed and convenient adjustment.

**RADIAL DRILLS.** Self-feed—large adjustable box table—separate base plate, every convenience.

**VERTICAL DRILLS.** Self-feeding—of new and improved designs.

**MULTIPLE DRILLS.** For boiler work, etc., 2 to 20 spindles, fed and returned by power or hand, together or separately.

**HORIZONTAL BORING AND DRILLING MACHINES.** For large pieces—with boring head, adjustable, vertically and horizontally.

**SPECIAL DRILLS.** For special work. Gun Blank Drills, Coal Drills, &c., built to order.

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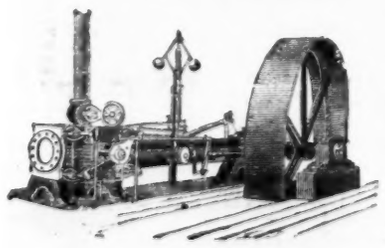
# CORLISS STEAM ENGINE.

The Best in the World for Economy in Fuel and Cost of Running.



BUILT BY

## Robert Wetherill & Co.,

Chester, Pa.,

**Engineers, Machinists, Founders,**

**And BOILER MAKERS.**

Stationary Engines, Shafting, Mill Gearing, Hoisting Machines, Improved Piston Packing and Machinery.

Special attention given to boring Ports and Cylinders.

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# A Written Guarantee given with our Pumps.

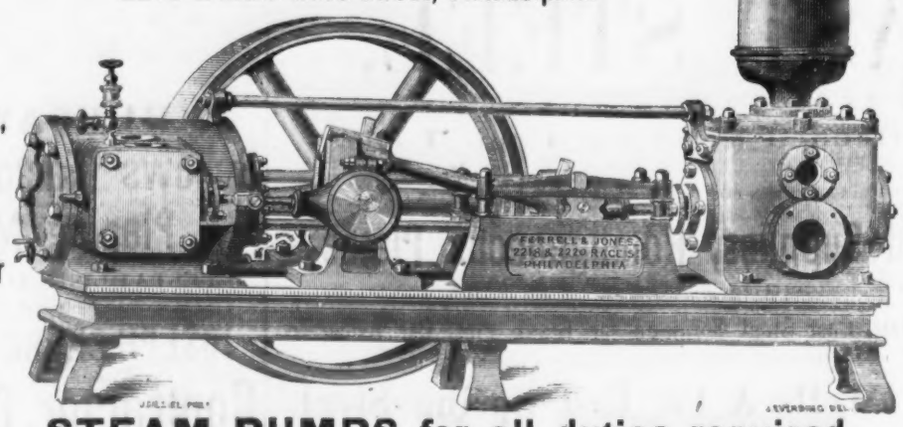
## ENTERPRISE HYDRAULIC WORKS,

2218 & 2220 Race Street, Philadelphia.

Fan Blowers.

Piston Blowers,

"FOULDS" Patent Water Elevator.



Our Fly Wheel STEAM PUMP is admirable For Fire Purposes.

## STEAM PUMPS for all duties required.

**Centrifugal, Hand and Power Pumps, Special Double Plunger Pumps for Mining Purposes. Boiler Feed and Tank Pumps.**

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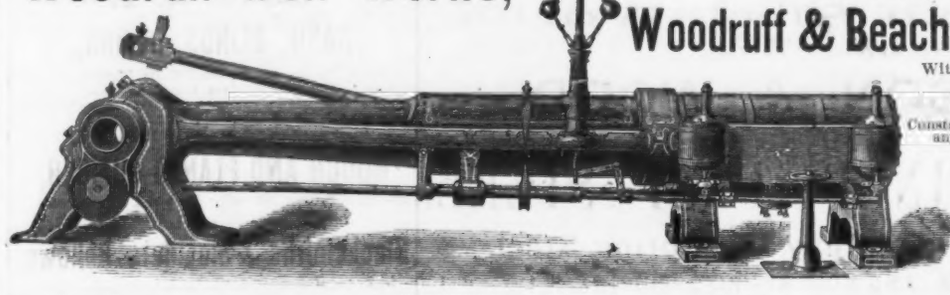
# Woodruff Iron Works,

Office, 223 State Street, Hartford, Conn.

Manufacturers of the Celebrated



## Woodruff & Beach Steam Engine,

With recent valuable improvements.

**Steam Boilers**

Constantly on hand and made to order any size or style. Special attention given to the manufacture of

**MILL WORK**

**And all kinds of Machinery.**

**CASTINGS**

Of any size or style. Direct all letters to **The Woodruff Iron Works, Hartford, Conn.,** as the Woodruff & Beach Iron Works and firm of Woodruff & Beach are both dissolved.

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# Knowles Patent Steam Pumps

MANUFACTURED BY THE

## KNOWLES STEAM PUMP WORKS,

WARREN, MASS.

WAREHOUSES:

14 & 16 Federal Street, Boston, 92 & 94 Liberty Street, N. Y.

Cut above represents regular Boiler Feed Pump, No. 3 and 4. Showing New Patent Valve Motion, and Hand Power LEVER Attached and Detached.

## FIRE PUMPS, a specialty.

Mining Pumps (both Double Acting Plunger, and Piston Pattern,) which we guarantee to run absolutely noiseless on any lift from 100 to 600 ft., at a single lift, a specialty. Pumps for every possible duty. Prices as low as any, and our workmanship and material altogether the Best.

Every machine furnished under a complete guarantee.

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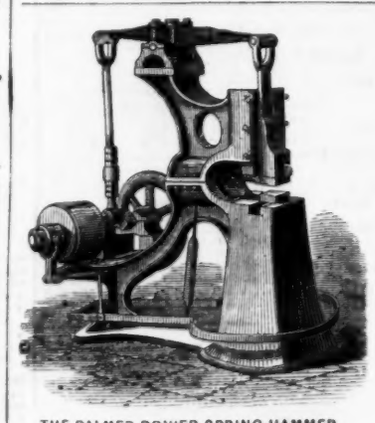

THE PALMER POWER SPRING HAMMER.

Of these Machines we are building sizes to meet the requirements of all Manufacturers and Workers of Iron and Steel. In simplicity, durability, ease of operation, accuracy, and range of work, we guarantee them superior to any Machines of their kind produced in the world. For prices, references, and full descriptive circulars, address

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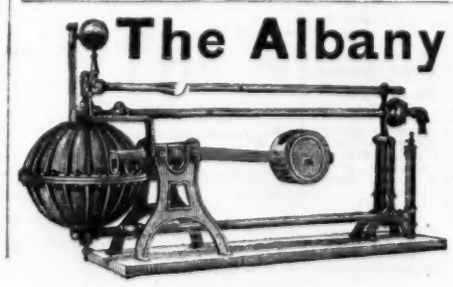
# The Albany Steam Trap.



This Trap automatically drains the water of condensation from *Heating Coils*, and returns the same to the Boiler *whether* the Coils are *above or below* the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

## TOWNSEND & BLESSING,

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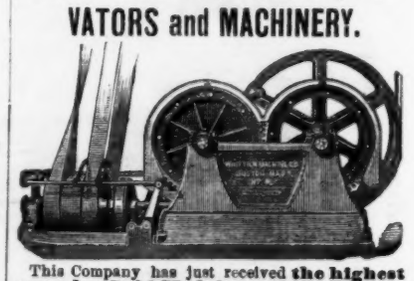
Manufacturers of

**STEAM ENGINES, BOILERS, ELEVATORS and MACHINERY.**



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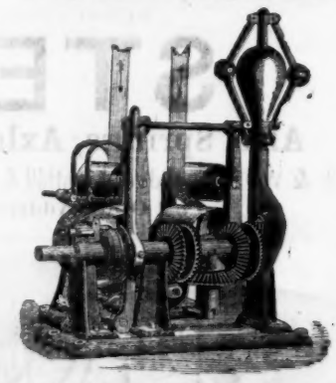
**FOR WATER OR STEAM.**



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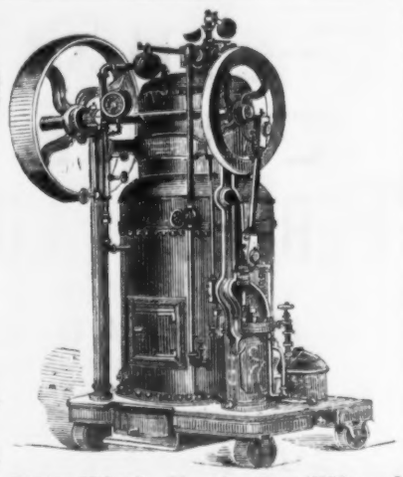

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ECONOMICAL.

**$200·00.**

Cheaper than any Engine offered of the same capacity.

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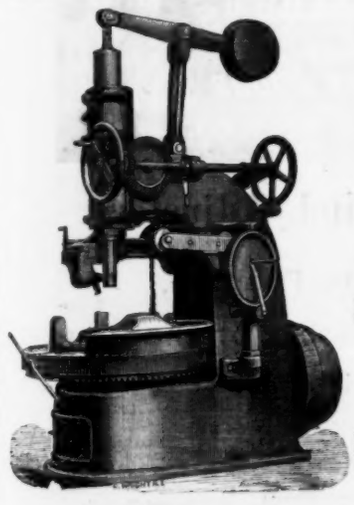

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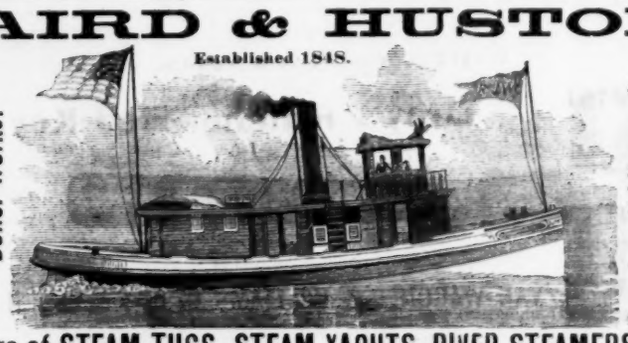

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**MARINE, (High or Low Pressure)**
Stationary, Hoisting & Portable Engines & Boilers. Propeller Wheels.

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**OF EVERY DESCRIPTION.**

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Send for Descriptive Price List.

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Pressure Blowers, Fan Blowers and Exhaust Fans.

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Our Steam Hammers, Lathes, Planers, Drills and Bolt Cutters

Are of Improved and Patented Construction.

**Railway Turning and Transfer Tables,**

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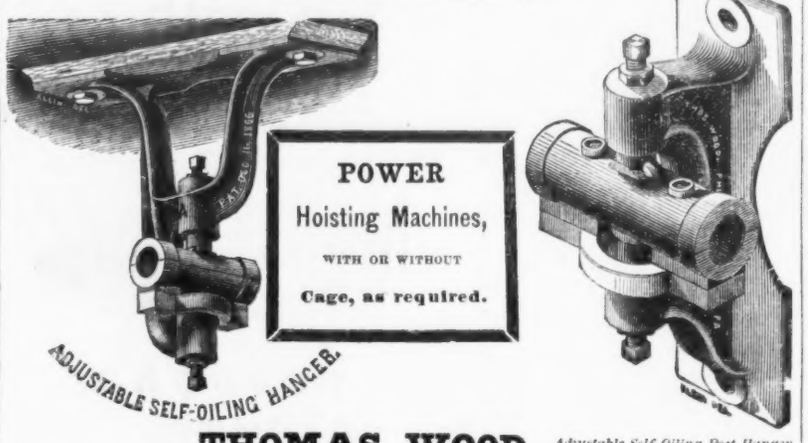


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MANUFACTURES AS SPECIALTIES,

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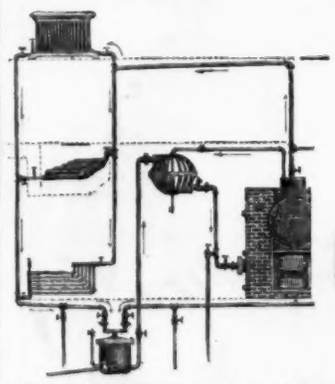

C. A. PROUTY,

Inventor and Patentee.

Address,

## Geo. W. Harrold,

**ROCHESTER, N. Y.**

We call the attention of the public to a novelty in the shape of an Automatic Steam-Trap, which returns in a continuous stream, and at a high temperature, the water of condensation, together with steam from the radiating pipes, to the boiler, below the water line. Keeping the pipes free from water prevents strain and leakage, and increases their radiating power. With this arrangement the engineer will find his labor materially lessened, since the same supply of water is converted into steam, condensed and returned to the boiler repeatedly, so that the loss of water is consequently very small, and an expensive pump is not required. This trap, which has been in operation for two years, is simple in construction and practical in application; there are no levers, weights, cranks, diaphragms or pistons to get out of order. It is self-operating, thus requiring very little attention, and will work with one radiator or twenty, only one size being needed. It is perpetual in its motion, and therein unlike other traps whose actions are spasmodic.

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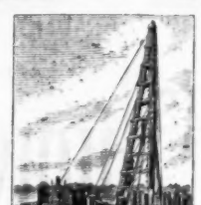

SEAM'S PATENT GUN POWDER PILE-DRIVER.

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BUILDERS OF STEAM DREDGING MACHINES,

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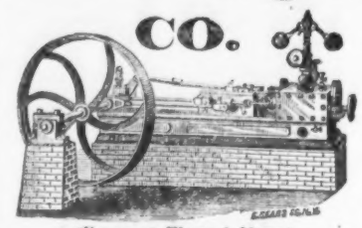

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**STEAM ENGINES**

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These Engines have always maintained the very highest standard of excellence. We make the manufacture of Engines, Boilers and Saw Mills a specialty. We have the largest and most complete works in the country with machinery specially adapted to the work.

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We are now building the celebrated Lane Circular Saw Mill, the best and most complete saw mill ever invented.

We make the manufacture of Saw Mill Outfits a special feature of our business, and can furnish complete on the shortest notice.

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LATHES, PLANERS,

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For Sale by

**New Haven Mfg. Co.,**

NEW HAVEN, CONN.

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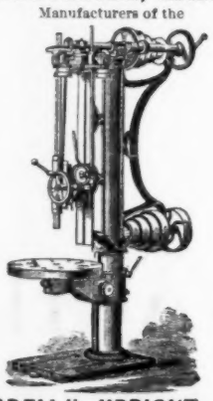
Manufacturers of the



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NEW YORK, February 26, 1874

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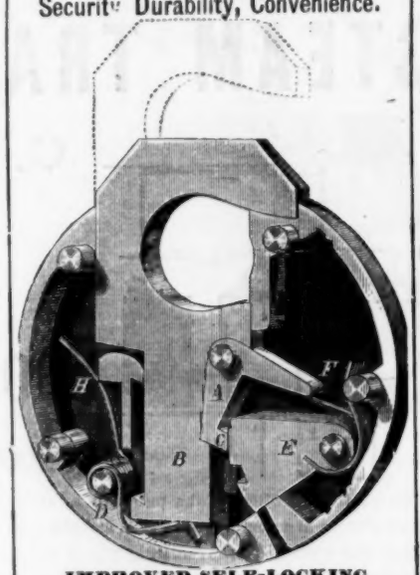

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INVALUABLE FOR BAY WINDOWS.

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AN EASILY ADJUSTED POWERFUL & EFFECTIVE SPRING.
MANUFACTURED BY
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